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ABSTRACT

This guide is a comprehensive interpretive plan for the development of a nature center. Although the plan centers on a proposed nature center, the ideas included in the guide can be applied to other situations. The guide deals with all aspects of planning and is divided into seven chapters. Chapter 1, Visitorship, looks at the people who attend nature centers. Chapter 2, Exterior Concept, includes such topics as plans for expansion of the school house, nature trails, planting schemes, exterior flow, and gardens. The Interior Concept, Chapter 3, looks at flow patterns, placement of interior facilities, visitor view, and other interior concerns. Chapter 4, Aura and Displays, examines possible displays, such as a bee hive, forest alcove, aquarium, and others. Chapter 5 deals with the justification and planning of audio-visuals and publications for the center. Chapter 6, Program Operations, discusses such needs as philosophy and objectives, funding, staffing, and maintenance. The Inventory, Chapter 7, provides an inventory of the topography, archaelogy, biotic communities and others. Most chapters contain illustrations, maps, and diagrams. Visitor centers in Wisconsin, sample scripts for slide shows, and a plant and bird list are included in the appendices. (TK)

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THE BEGINNINGS OF A
Nature Center

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a comprehensive interpretive plan coordinated and directed by

Gabriel J. Cherem
College of Natural Resources
University of Wisconsin – Stevens Point

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THE BEGINNINGS OF A NATURE CENTER

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The Purpose

Find the geographical center of Wisconsin; find an old brick school house; find a baker's dozen of alert graduate students. When you have done this, you will have found "The Beginnings of a Nature Center."

Our purpose was to apply theoretical interpretive concepts to a real world situation. That situation happily presented itself in a red brick building, in a county park, five miles east of Stevens Point.

Quite simply, this book is a recipe for converting a one room school into a center that will interpret nature. While the present building bears a shingle proclaiming "Pulaski School," the converted structure may become known as the Jordan Park Nature Center. This conversion will require three things: a plan, money, and a philosophical commitment. You are holding the plan.

These pages represent the tangible part of a course called Natural Resources 793, a course in Environmental Interpretation. Two hours a week for twelve weeks, we met in the old school house, gained a feeling for its moods and spatial climate, and spelled out ideas for its transformation. The ideas follow in a gently edited form which attempts to preserve the individual authors' styles.

Dr. Gabriel J. Cherem
Stevens Point, Wisconsin
July, 1974

The Authors*

Tom Blotz, Park and Recreation Administration

Mary J. Cray, Elementary Education

Robert O. Ellingson Jr., Forest Recreation

Sally K. Freckmann, MST Education of Biology and Phy. Ed.

George R. Fricke, Natural Resources

Larry J. Hendry, Social Studies Education

Edward C. Marks, Museum Studies

Thomas J. Perkins, Parks and Recreation

James R. Peterson, Natural Resources

Anthony M. Pudlo, Biology

Albert Savastio, Forest Recreation

Eugene Tubbs, Soil Science

Donald E. Westover, Forest Recreation (Planning)

* graduate students at the University of Wisconsin/Stevens Point

The Credits

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Our hearty thanks to Mr. Gerald Ernst, Superintendent of Portage County Parks, and to Mr. Had Manske of the Portage County Park Commission for their ideas and assistance during our planning sessions. Also our appreciation to all members of the Portage County Park Commission for their cooperation in this venture.

We thank the following members of the Portage County Preservation Projects for their input during our planning sessions: Sally Freckmann, Nancy Stevenson, Rosemary Rossier, Norma Booke, and Marguerite Baumgartner.

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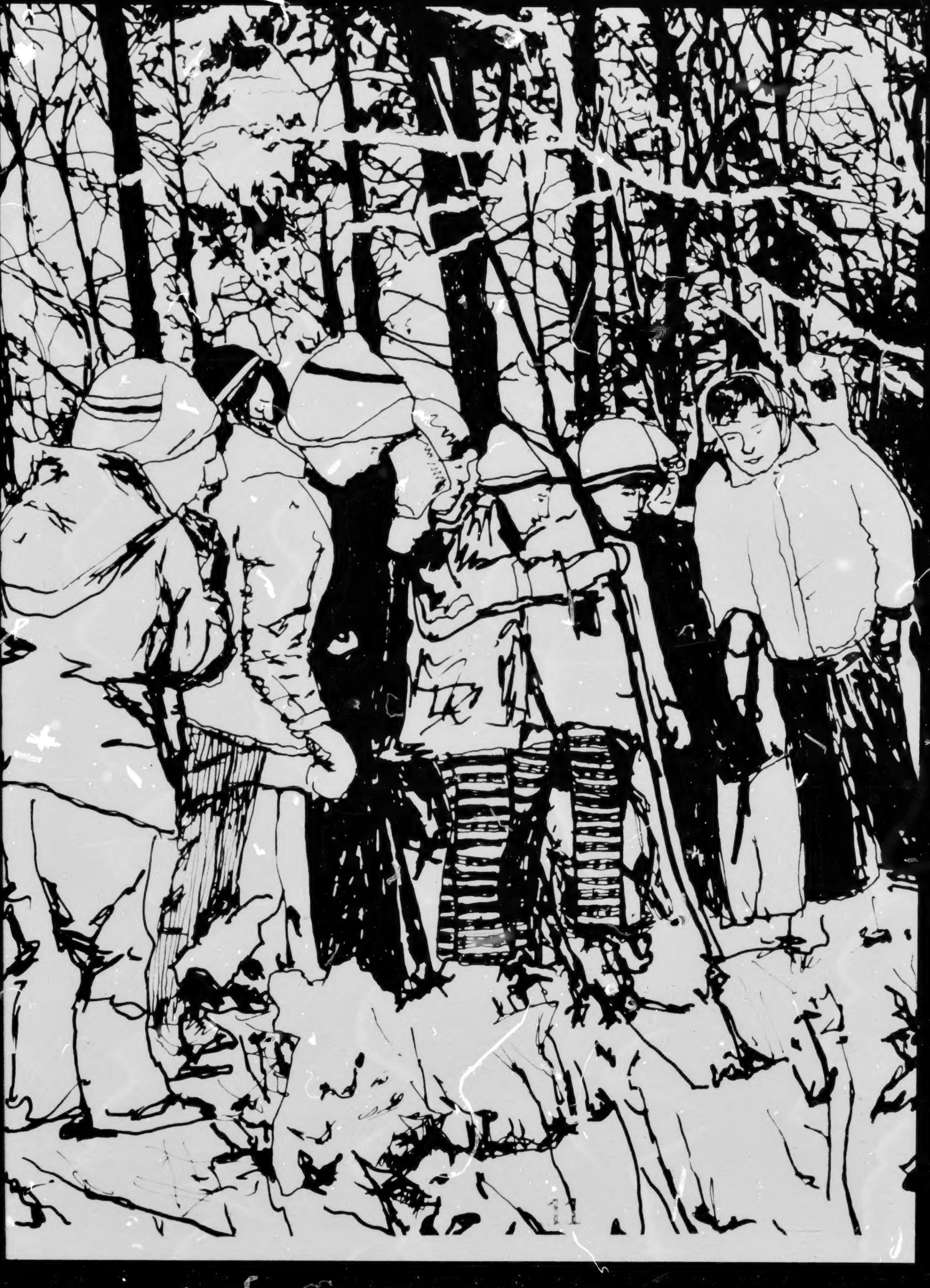
VISITORSHIP

Mary J. Cray



A nature center is more than a place--a physical structure with surrounding land area. It is an event, a potential experience for a member of the community. Who is the individual who will have taken the time to visit the Jordan Park Nature Center?

- Elaine is a housewife who enjoys a chance to be with her school age children this Saturday. She enjoys watching them learn and get excited about what they and she are learning together.

- George works for Sentry Insurance in Stevens Point. Today is warm and sunny and the center is a restful area in which to spend his lunch hour away from work.

- Mr. Adamski has been retired now for several years. Since retirement he has developed a new hobby, bird watching. At least once a week he pursues his new hobby at the nature center. Most enjoyable and informative are the conversations he and the naturalist have after spotting a returning oriole in the spring.

- Joan and Frank, who were born and raised in Milwaukee, are just traveling by and spotted the rustic sign of the nature center. They are particularly interested in walking the nature trail, desiring to see plants and possibly animals in their natural surroundings. Both feel that this kind of experience ought to be frequent if they are to remain living in an urban area.

- Mrs. Stevenson has taken her class of twenty to the nature center to view the exhibit on how animals adapt to their winter environment. It's a mild day, snowing slightly, and the children have an excellent opportunity now to hike the trail and look for animal tracks.

Whatever the conscious reasons for visiting and using a nature center, it seems that perceiving natural symbols is a part of man's nature and is essential to his mental health. A nature center, if well planned, can fulfill cultural needs for aesthetic experiences which stimulate thought and feeling (Ashbaugh, 1970). Perhaps a nature center can provide a means of expression for these types of experiences.

Many educational programs are now introducing their studies through exercises in learning to become a part of nature. They encourage students to merge with the natural environment consciously. This acclimatization approach is interested in the individual's heightened awareness and respect for the wholeness of the environment (Moize, 1974). The purpose of this kind of an awareness is not to gain facts such as remembering the name of a wild flower, but to remember its fragrance, the texture of its leaves, and where to find it.

If the nature center is to provide the role of a teaching laboratory for visitors, then it must provide a natural setting where individuals can engage in firsthand discovery and exploration. To satisfy a variety of visitor needs, the center should be a means of education whereby visitors gain knowledge about nature through "personal" experience. As John Burroughs said, "It is not so much what we see in nature but how we interpret what we see." (Ashbaugh, 1970). The processes of seeing, feeling, and thinking should be expanded and integrated so that visitors are interpreters rather than mere bystanders. When a program focuses on the fact that visitors have five senses, the traditional "audience" role of the visitor vanishes. Greater learning takes place when more senses are exercised. Visitors need a variety of experiences to reach and stimulate these senses so that they are involved in what is being presented.

Due to the very nature of the individual, the center must also meet the need for order (Kaplan, 1970). A visitor must be able to make sense out of exhibits and activities presented. If there is no observable order at the center, visitors will leave frustrated and disappointed.

Nature centers can do a great deal in correcting and developing the attitudes of people toward the environment. People can then determine and evaluate their relationship to the rest of nature. McHarg expressed this view when he said:

> I am much more concerned with seeing the ecological point of view permeating society and education than with seeing the sole preparation of ecologists in the narrow sense, although these are terribly important people, too. (McHarg, 1965).

Many individuals are now interested in conservation principles and need to know practical applications of information gathered at the center. Some visitors are interested in more detailed information about the environment and, therefore, will use the center for research purposes. Still others may use the center as a backdrop for informal activities such as painting, sketching, photography, hiking, or jogging. The greater variety of activities that can validly go on at the nature center, the greater amount of community participation there will be.

SUGGESTIONS FROM OTHER CENTERS

To get some idea of the kinds of groups who attend other nature centers in Wisconsin, we called or wrote and received information from various centers. A great deal of the information is pertinent to the program at Jordan Park. Naturalists and representatives of the centers were very interested in our program and eager to tell us about their programs, some of the problems we should watch for, and suggestions they felt would be of help to us. A detailed survey of these centers can be found in Appendix A.

Most of the centers feel that their purpose is educational. They believe that visitors should be actively involved in what is taking place at the center rather than be lectured to. Appreciation of nature should be stressed rather than great detail about any one particular topic. Those visitors desiring more detailed information will seek that out naturally. One naturalist stated that by getting visitors involved in the environment, life styles may begin to change. He felt that with a change in attitude toward the environment, people would rely less upon machines and more upon their individual resources.

Naturalists at the centers felt a great need to have teachers more prepared to take advantage of the center when they bring their students. Some teachers and students arrive with a "picnic" spirit, ready to enjoy the setting for recreational purposes but not able to take advantage of the educational offerings of the center. Due to lack of preparation, teachers and students miss these latter opportunities, which are also quite enjoyable. For this reason, many centers are now presenting teacher workshops in ecology, conservation, and environmental education. Many are now requiring advanced reservations. Requiring advanced reservations also allows the visitor center to control the amount of visitors on any given day. (See Table 1-Visitation Request Form.) In some centers, when requested, the naturalist will go to the school prior to the visitation with a slide program pointing out some of the relevant features at the center. At others, the naturalist will request the particular topic being studied in the classroom and will be prepared to point out displays relevant to that topic.

Nature centers associated with schools relate activities with various subject areas in the curriculum. Social studies classes, for example, are involved with concepts of exploration and colonization. Another social studies class had an archeology lesson with a simulated pit. Physical education classes have an area set up with a "natural" obstacle course. These kinds of centers develop excellent outdoor education activities.

TABLE 1 - VISITATION REQUEST FORM

MACKENZIE ENVIRONMENTAL CENTER
Poynette, Wisconsin 53955
608-635-4498

ALL GROUPS MUST BE SCHEDULED IN ADVANCE - PLEASE FILL IN THIS FORM AND RETURN IT AS SOON AS POSSIBLE.

VISITATION REQUEST FORM

School or Group ______________________________

Address ______________________________ Zip __________

Teacher or Leader ______________________________

No. in Group ____________ Grade Level __________ Telephone __________

Date of Tour __________ Arrival Time __________ Departure Time ________

Type of Visit

☐ Naturalist Guided
☐ Leader or Teacher on Their Own (Talk to one of the naturalists)
☐ Activity Oriented (Contact a naturalist for planning)

This Section is to Help us Plan a More Meaningful Visit For You.

What is your educational objective for visiting the Center? __________

____

Is this part of a unit you are teaching? ______________________________

If so, what is the unit about? ______________________________

Would you like to study something specific when you come? __________

If so, what? ______________________________

Any other comments, requests, etc.? ______________________________

____

____

This form is not a confirmation unless so marked. We will confirm your date by phone or mail. A phone call from you will hasten your request or confirmation.

No rain dates will be possible. We work in all weather. Notify us in case of cancellation.

For Office Use Only

________ On calendar
________ Confirmed
________ Materials Sent
________ Teacher Packet

Visit Data

Naturalist __________
Time __________
Oriented By __________
Self-Guided __________
Comments __________

Most of the centers contacted have very little vandalism. Those who had the least were those who had a custodian living on the premises. At the Madison Arboretum a ranger prevents vandalism in a "pleasant" way. He is also there to help visitors secure needed information. Nature centers that are away from main roads seemed to have very little vandalism. Most incidents deal with damaged markers, autos driving over grass areas, and strewn beer cans (particularly at high school graduation time).

Other suggestions from the naturalists were that there be a full time naturalist whenever this is possible. Most of the naturalists also stressed that the program should grow gradually. A program that is rushed tends to make larger mistakes that are not easily reversed.

VISITOR DATA AND EVALUATION OF THE NATURE CENTER

Few of the nature centers contacted had detailed information about the numbers of individuals representing various visitor groups. All of the centers could approximate the amount of visitors from school, teacher, youth, and professional groups. Very little information had been gathered about visitor origin, occupation, age, experiential background (in terms of environmental education), and attitudes about nature in general.

In the beginning of this section it was stated that a nature center can fulfill various roles: 1)It can fulfill cultural needs for aesthetic experiences, 2)An individual's awareness and respect for the wholeness of the environment can be developed, and 3)It can provide the role of a teaching laboratory for visitors and can engage them in firsthand discovery and exploration. If we are to truly accomplish these goals, then we must have some means to evaluate our effectiveness. If we are to view visitors in more than an audience role, we must provide opportunity for them to interpret and evaluate our programs. Practically speaking, there is no way for a staff member to see and experience what the visitor sees and experiences unless the visitor somehow communicates this information.

For the benefit of more effective program planning, a visitor survey form or questionnaire should ask for the following information: age, sex, occupation or profession, city and state of residence. This type of information is necessary for the naturalist to determine whether exhibits and information pamphlets are geared toward the groups represented in attendance (Cherem, 1971). Not all exhibits should be geared toward one group. However, if a majority of visitors are elementary and high school students, then a sizeable amount of exhibits should be available to meet their needs. The same would apply if professional people or housewives frequented the center. When the center is open officially for the public, the first exhibits and activities will set a definite tone. With this in mind, the naturalist should avoid stereotyping the center as meeting the needs of one or a few groups.

Other types of information concerning the visitorship would be useful. How many times has the individual visited the nature center? Why did the individual come to the center? Did someone tell him about the center? Was he just passing by? Would he enjoy returning another time? Why?

Open-ended questions will elicit information concerning feelings and attitudes about the center. A question like, "What would you like to see at the nature center?" may give further ideas for exhibits and activities the naturalist may want to use in the future. To find whether exhibits or activities are environmentally practical, it might be good to ask, "How do you plan to use what you have learned at the center?" This type of question may even stimulate a thought where it may not have existed before. A unique set of questions could be developed for organized school groups. Evaluation can take place when students and teachers have returned to school, thereby extending the experience.

Questionnaires do not have to be on hand at all times. Verbal feedback can also have advantages. When there are not many visitors, the naturalist and staff may have the time to engage in informal conversation. At these times, however (if information is interesting or pertinent), the naturalist or staff member should in some way record what was said. Most people are very willing to respond to questions, whether written or verbal (Cherem, 1971). Again, this places the visitor in more than an audience role.

VISITOR GROUPS LIKELY TO ATTEND THE JORDAN PARK NATURE CENTER

The Jordan Park Nature Center will be solidly grounded to reach its full potential if it is individualized to the unique needs of its community. The needs of the community will be best served if in the initial phases of implementation, care is taken to consider and perhaps involve all segments of the community in the process of planning the nature center services. The following is a list of types of visitor groups and individuals likely to attend the nature center.

TABLE 2 SCHOOL ENROLLMENT IN STEVENS POINT

STEVENS POINT PUBLIC SCHOOLS 1973-74 ENROLLMENT

School	Enrollment
SPASH (Stevens Point Area Senior High)	1,665
Ben Franklin Junior High and	980
(6th graders)	222
P.J. Jacobs Junior High	884
Emerson	240
Grant	94
Jackson	504
Jefferson	225
Kennedy	391
Madison	573
McDill	388
McKinley	528
Roosevelt	444
Washington	678
TOTAL	7,809

STEVENS POINT CATHOLIC SCHOOLS 1973 ENROLLMENT

School	Enrollment
Pacelli	545
Saint Joseph	174
Saint Peter	276
Saint Stanislaus	414
Saint Stephen	318
TOTAL	1,727

A. Students (See Table 2.)

Young children very often are only exposed to areas where natural habitats are in a state of destruction. A nature center can be a place where the inate curiosity of students can be stimulated to observe the mysteries and wonders of intact nature.

A nature center can afford adolescents with an opportunity to be involved in constructive and educational activities. For many, the nature experience could be a training ground for future activities in conservation and environmental education. The center can actually be a laboratory for students.

As nature centers throughout Wisconsin point out, student groups are frequent visitors. If school groups will be using the Jordan Park facility, the experience should begin before the actual visit. Students should be prepared for the outdoor experience and introduced to concepts to be understood. Programs can be developed in which varied types of thinking are called upon. The U.S. Forest Service's Sylvania Visitor Center developed questioning techniques which prompt cognitive, divergent, convergent, and evaluative kinds of thinking. Concepts rather than information are stressed (USFS - Eastern Region, 1971).

After the visit the students must be involved in the evaluation of the experience and must relate that experience to the school curriculum. The center may actually distribute post-trip materials to each teacher. These materials can be designed to reinforce key environmental concepts and practical application of those concepts.

B. Teachers

Very often teachers do not feel comfortable in taking students to a nature center. This is due to the fact that they are not themselves familiar with environmental education concepts or techniques. In some school systems, one teacher at a school (if any at all), has the responsibility of handling environmental and conservation education.

To alleviate this situation, the center could conduct environmental workshops for teachers. It may be surprising to some just how easy it is to overcome a feeling of incompetency with a few well planned workshops in which teachers are actively involved.

Perhaps one of the most successful school programs in Stevens Point takes place at the Jackson School under the guidance of Nancy Stevenson and concerned faculty. Mrs. Stevenson conducts environmental lessons at the school and has already made good use of the Jordan Park facility. Also, Mrs. Stevenson has done much "footwork" in contacting teachers at other schools interested in environmental education programs.

In the future it would be good for the naturalist to be in contact with interested individuals at various schools. Names given to us of interested teachers at Ben Franklin School are: Steve Gorski, Robert Klein, Gordon Mortenson, and Ruth Olsen; at P.J. Jacobs: James Kocha, Gerald Hoff, and Harriet Angelich; at SPASH: John Sporakowski and Charles Hunger.

C. Curriculum Coordinators

Mr. L. D. Volland, Curriculum Coordinator K-12, of the Stevens Point School System, feels there is a strong need for a nature center in the Stevens Point Area. As of this time all fifth graders in the system go to the Boston School Forest and are involved there in special projects. All sixth graders spend three days at Camp Chicagami on Sunset Lake. Teachers accompany them and carry on lessons outdoors which relate to nature. Other nature programs are left up to individual schools.

Mr. Volland stressed that he would like to see a process approach applied to nature studies in which activities are ordered in sequence to provide a developmental progression of increasing competence in nature processes and skills. Methods of evaluation are inherent in the program (AAAS Commission on Science Education, 1967).

D. Handicapped

We were surprised to find the number of programs that are available for handicapped children and adults at nature centers in Wisconsin. Naturalists did not find it difficult to provide for the special needs of these individuals.

Keith Lindstrand, Director of the Chileda Institute for Educational Development, was very interested in taking advantage of the facilities at Jordan Park. Of the twenty-one children enrolled in the year-round program at the institute, twelve to fifteen children can walk. Their ages range from five to fourteen. In the summer there will be a program for fifty children with learning disabilities.

With advance planning, low level activities can provide the children with an enjoyable as well as educational experience. Mr. Linstrand can be contacted at P.O. 530, Steiner Hall, 1317 Fremont, Stevens Point.

E. Families and Hobbyists

Not only do individuals use nature centers for academic study, but also for pursuit of hobby interests. Individuals and families may enjoy taking a walk through the woods to enjoy the fresh air and sounds of nature as a contrast to everyday living situations. Nature photography and bird watching are certain to be popular at the Jordan Park Nature Center.

F. Professional People and Organizations

A few naturalists contacted noticed a trend in the growing interest of professional people to take part in activities at nature centers. Many professional organizations are feeling a greater responsibility to promote and maintain nature areas in ever increasing urban centers.

Organizations very likely to be interested in the nature center are YMCA groups, Girl Scouts, Boy Scouts, Isaac Walton League and the Lions Club.

The Portage County Preservation Projects Incorporated, Portage County Park Commission, and the Park Superintendent have been among the prime motivators in establishing a nature center in Jordan Park. The former organization has done extensive work in establishing and maintaining three self-guiding trails at the center. Preparation for a final version of a Trail Guide is now taking place.

G. Senior Citizens

Other nature centers have shown that senior citizens enjoy attending activities and using the facilities for hobby pursuits. Transportation, however, is often a problem. One center noticed that if senior citizens live nearby, they will visit the center frequently. In Stevens Point there is a housing development on Briggs Street occupied predominately by senior citizens. This development should be contacted upon completion of the nature center.

H. Urban Residents

Since Portage County is considered to be a small urban area (Wisconsin Bureau of Planning and Budget, 1971) activities at the nature center should involve urban residents in an evaluation of the impact of man on his environment. The classical idea of studying solely undisturbed natural communities is unrealistic. Programs at the center should help each visitor to see himself as part of his surroundings and to recognize his importance and individual responsibility (Ashbaugh, 1970).

Public awareness of environmental issues has had the effect of generating interest in nature studies and natural history. According to the 1972 Wisconsin Outdoor Recreation Plan, much of this interest is catagorized as "sightseeing." Often this activity relies on nature study facilities and programs.

Data regarding Wisconsin's projected population as well as that of Portage County indicates an increase in recreational participation in such activities as camping, sightseeing, hiking, pleasure walking, and nature study. Hiking and pleasure walking alone will double in participation by 1990 (Wisconsin Outdoor Recreation Plan, 1972). These figures clearly indicate the need for facilities involved in nature programs.

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EXTERIOR CONCEPT

James R. Peterson

Tom Blotz

Robert O. Ellingson Jr.

In this section, we will deal with exterior design concepts of the Jordan Park Nature Center. We have divided our task into three areas including: 1)structural aspects, 2) exterior flow, and 3) planting scheme.

The existing facilities begin with an old, one room, red brick school house with an attached woodshed. To the south of the school house is a large animal pen containing elk, fallow deer, whitetail deer and peacocks. To the west lies a twenty unit campground. North from the school is a trail head, marking the beginning of a twenty-five station, self-guiding, nature trail. To the east is a picnic area and Jordan Pond. (See Illustration 1.)

STRUCTURAL ASPECTS

Many structural aspects of the projected nature center are fixed because of the current design of the building. However, some flexibility can be incorporated into the support structures. Also, periodic remodeling can have a flexible effect.

A unified approach is imperative at the Jordan Park Nature Center. Because we are using an old school house, some attempt will be made to keep the old school theme. We feel the educational aspect of this building relates to the new educational purpose, that of an interpretive nature center.

The Old School House

At present, the school is approximately 60' x 32'. Proposed new dimensions (including the addition of a warming room - demonstration room, and flush-type toilets) will be 75' 6" long by 41' wide (at the north end) and 32' wide (at the south end). The new addition will be 41' x 27' 6". The toilets will extend to the west from the existing school by approximately 9'. (Illustration 2)

JORDAN PARK

Illustration 1

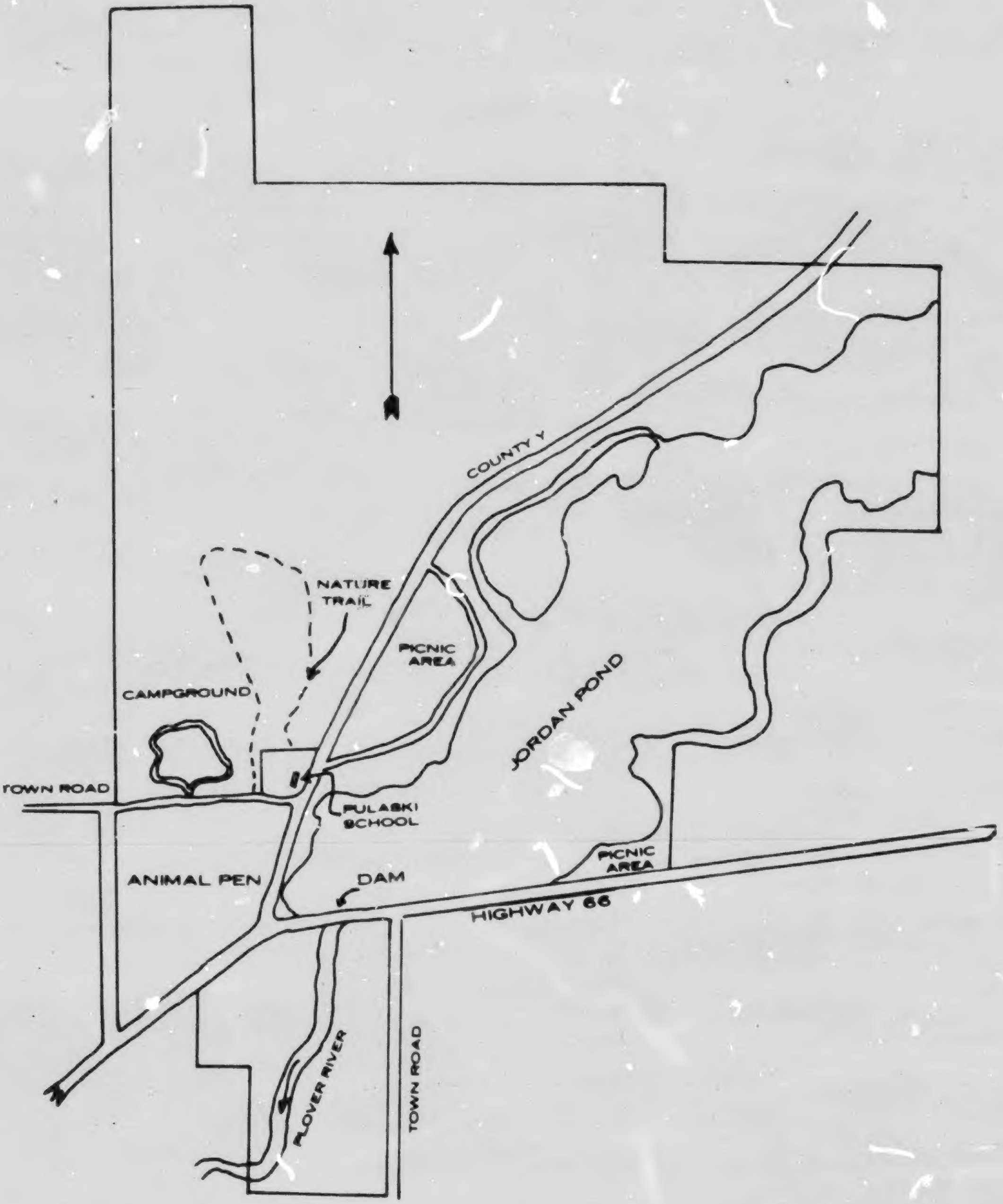
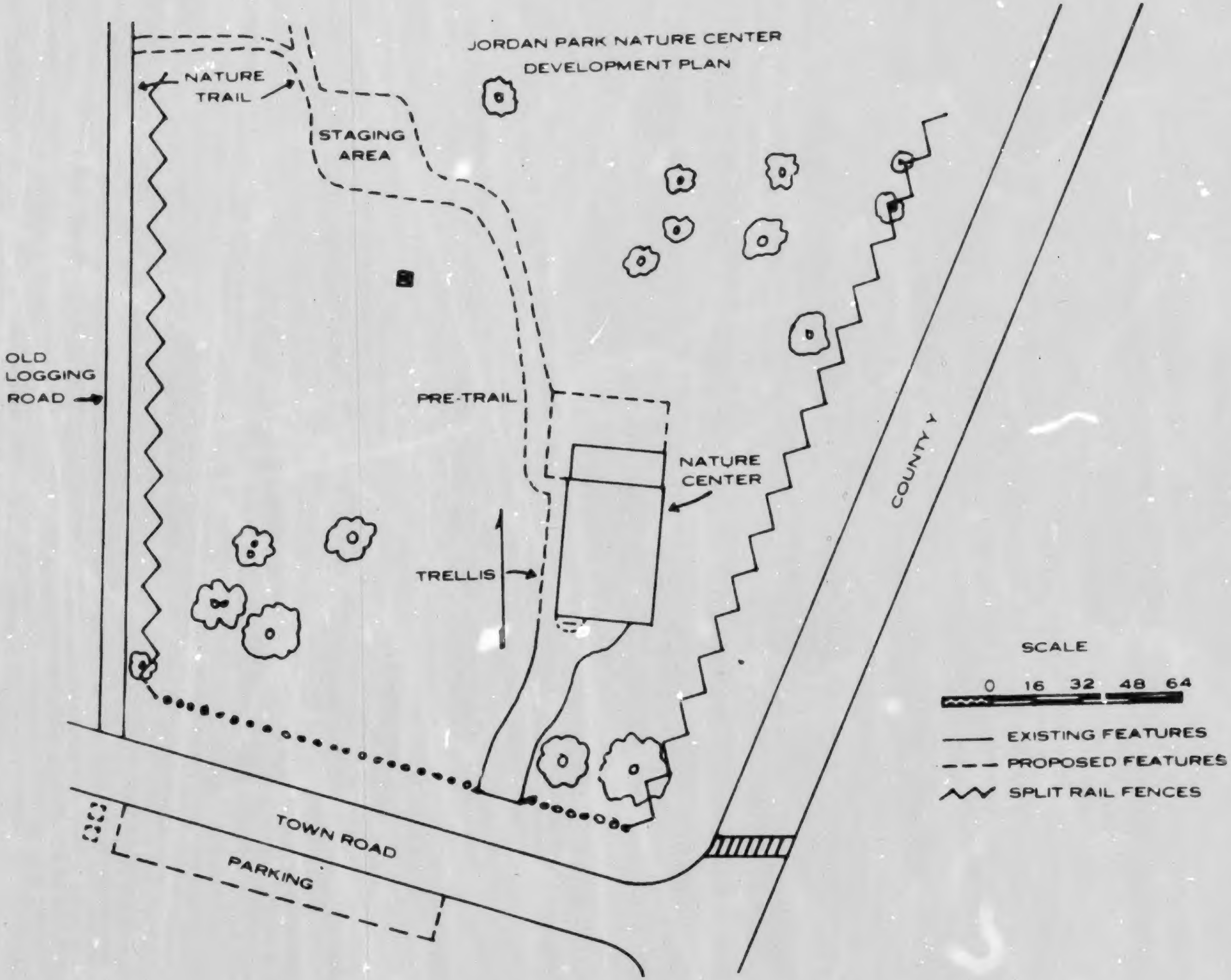
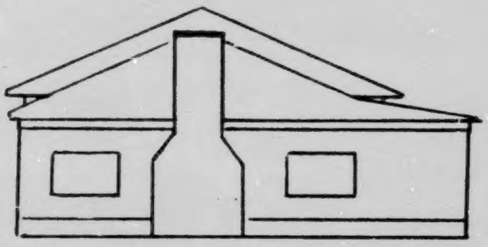

COUNTY Y
NATURE TRAIL
PICNIC AREA
CAMPGROUND
JORDAN POND
TOWN ROAD
PULASKI SCHOOL
ANIMAL PEN
DAM
PICNIC AREA
HIGHWAY 66
PLOVER RIVER
TOWN ROAD

Illustration 2


JORDAN PARK NATURE CENTER
DEVELOPMENT PLAN
NATURE TRAIL
STAGING AREA
OLD LOGGING ROAD
PRE-TRAIL
NATURE CENTER
TRELLIS
COUNTY Y
TOWN ROAD
PARKING
SCALE
0 16 32 48 64
EXISTING FEATURES
PROPOSED FEATURES
SPLIT RAIL FENCES

The new addition will be built using brick that matches the existing brick on the school. The roof will keep the same lines and will be of a slightly lower pitch than the existing school roof. The same color shingles will be used to continue the old school effect. In this way, the new addition will not stand out from the original school.



PROPOSED ADDITION

The existing woodshed at the north end of the building should be torn down, because of its unstable structure and foundation. (The old bricks should be saved.) The north face of the new addition will include an 8' wide fireplace with 4' x 6' windows on either side.

Because of the flush-type toilets, it will be necessary to have a vault-type septic system. The common septic-type drain field cannot be used here as the water table comes within two feet of the surface.

The existing school building will receive a face lifting by 1)"pointing" the bricks, 2)blocking the east windows (for sound buffering) with old brick, 3)moving the electrical conduit and meter from the south wall to the east side where it would be less conspicuous, and 4)by painting the wooden trim in a dark brown color. Dark brown should be used here because of its similarity to wood and low contrast effect. The windows on the west side will be changed also. Presently, there are five 3' wide windows. The southern-most window will be enlarged to encompass the second, the third and fourth windows will also become one and the fifth window will become blocked off because of the protruding new addition's restriction on the viewing angle. This will result in two, 10' x 4' windows, 7 feet from the ground level. (Illustration 3)

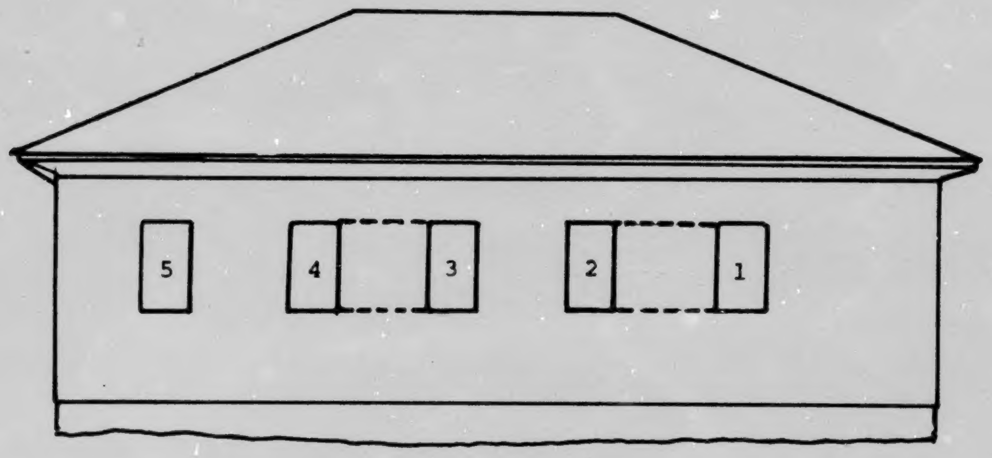
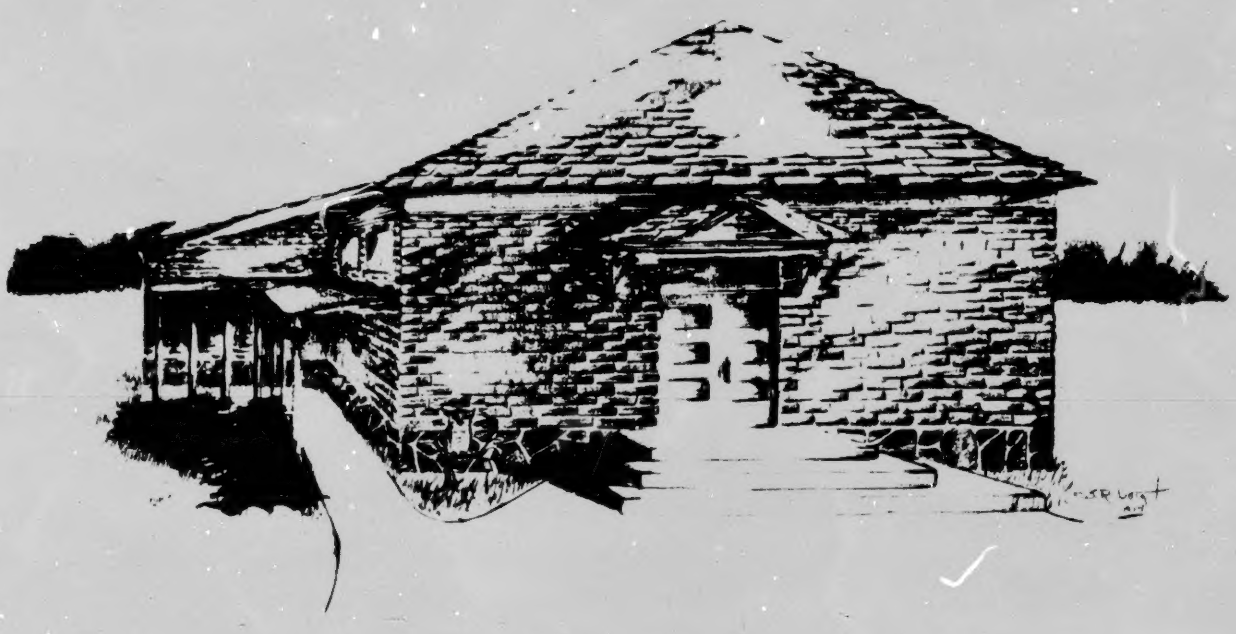


Illustration 3

A trellis will be constructed just below these windows. (Illustration 4). It will be built using 4" x 4" rustic beams, with a solid roof extending 6' from the school wall at a slight downward angle. This angle will allow for runoff of precipitation. The trellis will extend 48' to the new addition and continue 9' out from the old school along the new addition. The trellis will serve as protection for the pre-trail which runs along the west side of the school.

Illustration 4

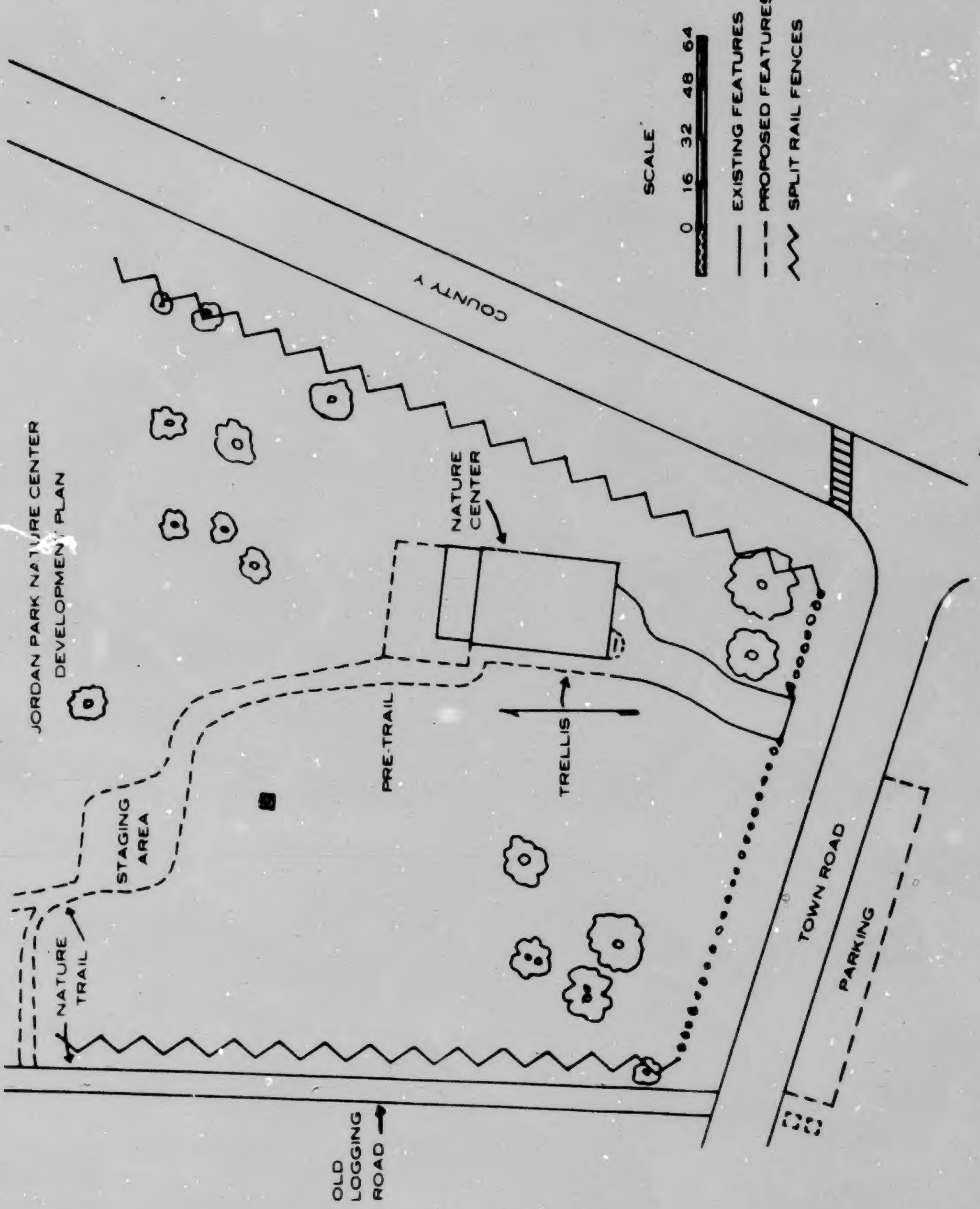


Pre-Trail Area

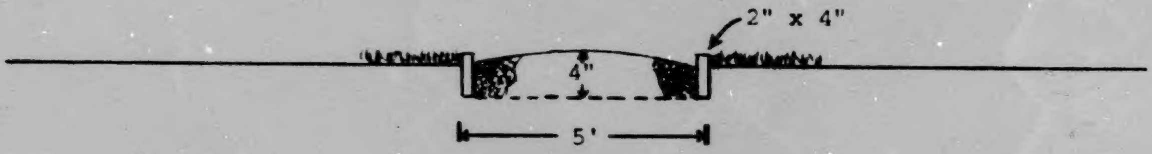
The pre-trail will start at the gate north of the town road and run to the south end of the building where it will constrict to a 5' trail and run along the west wall of the nature center, under the trellis, out to the trail head. (Illustration 5)

Illustration 5

JORDAN PARK NATURE CENTER DEVELOPMENT PLAN


COUNTY Y
NATURE CENTER
PRE-TRAIL
TRELLIS
STAGING AREA
NATURE TRAIL
OLD LOGGING ROAD
TOWN ROAD
PARKING
SCALE
0 16 32 48 64
EXISTING FEATURES
PROPOSED FEATURES
SPLIT RAIL FENCES

Because of the proposed heavy use of this pre-trail, it is necessary that it be surfaced. The surface material will also prevent it from becoming muddy and slippery underfoot during periods of heavy rain (Ashbaugh and Kordish, 1971). The surfacing material in this case should be crushed, red granite, pea-gravel (native to this local area). It was chosen because of its suitability and because it is relatively inexpensive compared to concrete or blacktop. The red color will also complement the bricks of the old school building. Because of its loose consistency, it may create a slight problem for the handicapped. With expansion of the center, this trail could be hard surfaced. Treated two-by-fours will be used as borders along the pre-trail. This will prohibit the scattering of the granite onto the surrounding area. The surfacing material will be 4" deep and lie in a 3" "cut-out" with a 1" protrusion above the surface.



Nature Trails

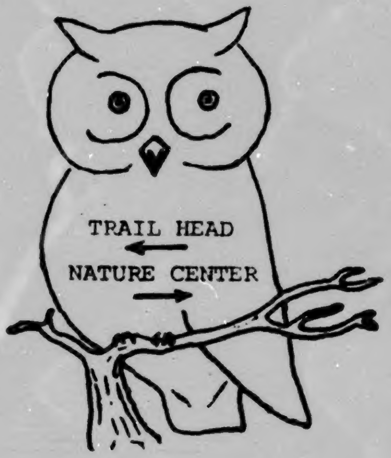
A trail head has been constructed to direct visitors to the 25 station, self-guiding, loop trail already in use. The Portage County Preservation Projects group opened this trail in the fall of 1973. It is approximately 3/4 of a mile in circumference. Also proposed for completion by the P.C.P.P. are two more trails north of the existing one - a wildlife trail, and a wilderness trail. The completed self-guiding loop will probably receive the heaviest use, and at a future date, it may be wise to surface this trail with woodchips or a similar natural material. We would also recommend a labeled soil profile pit near one of these trails.

Parking Lot and Toilet Facilities

As the visitors exit from the trail down the old logging road, they will arrive at the parking area. (Illustration 5). This parking lot will be approximately 100' by 16' with a capacity of about twelve cars. The lot will be surfaced with the same cursched red granite used on the pre-trail. At the west end of the parking lot, two self-contained toilets will be constructed. These facilities would serve the arriving and departing visitors.

Signing

A concept important to the continuous flow of the visitors is signing. Caution should be taken not to have too many signs and the ones you do have should fit into the natural scheme. These signs should be simple and not "crammed" with useless information. They must be legible, look professional, and be placed at appropriate spots. An example of this would be the orientation-information sign at the south west corner of the center. The "resident owl" used here exemplifies an attractive, simple, directional and informational sign. The "wise old owl" image is a good non-verbal logo tying the school concept to the nature concept, as most people associate an owl with teaching or scholarly activity. An attempt to deviate from the common rectangular shaped sign approach is apparent.



According to Charles Rombold (1963), the letters on this sign should be 1" high so they are legible from a distance of 53" in upper case and 43" in lower case. The lines should be a minimum of 2" apart. The arrow width should also be 2". A contrast between letters and the background on which they are seen is necessary so the message can be read clearly.

The owl silhouette should be stained with a medium to dark brown wood stain in keeping with the brown trim of the building. In this case, we chose a white color for the lettering of this routed sign. Color coded signs are used by a number of parks and nature centers--one color for nature trail signs and one for orientation-information signs. The base of the resident owl sign is a tree branch that can be found almost anywhere. It would be best to keep all materials as natural looking as possible to maintain the natural effect.

Signing is an important factor in the concept of continuous flow of traffic throughout the nature center area. The next section will deal with this flow.

EXTERIOR FLOW

Present

At present, heavy automobile traffic exists along County Highway Y and on Wisconsin Highway 66 with some light traffic along the town road in front of the nature center. For orientation to these roads, see Illustrations 6 and 7.

At present, there are no controls on foot traffic in the area. The nature trail controls flow through the woods to the north of the center, but even here people have been observed going in both directions while hiking. Visitors cross County Y all along the east side of the building, some taking a short cut to the campground. Visitors also cross the west lawn as they are going to and from the trail head.

Proposed

Long range plans should be developed to re-route County Y around to the west side of the park. This would minimize non-visitor traffic through the park and would greatly increase the safety of the visitors. The town road should also be closed allowing less traffic to flow through the proposed parking lot. Plans should also be made to increase the size of the parking lot to 150' x 125', large enough to accommodate approximately fifty cars. The parking lot should be moved farther from the nature center to provide an area where children can wear off some excess energy while on their way from the car or bus to the nature center. The closing of these two roads would create a single easily controlled entrance to the park. These long range plans can be seen in Illustration 8.

Short range plans should be developed to control both foot traffic across County Y and the speed of traffic through the park on County Y to maximize visitor safety. Also, visitor foot traffic should be logically funneled to the nature center, and from the nature center to and from the trail system.

On the way from the building to the trail head, we have planned a "staging area". This will serve as an area where people on guided tours can be: 1) oriented to the trail, 2) cautioned on what to look for, 3) informed of the trail ground rules, and 4) introduced to the plants and animals

JORDAN PARK

Illustration 6

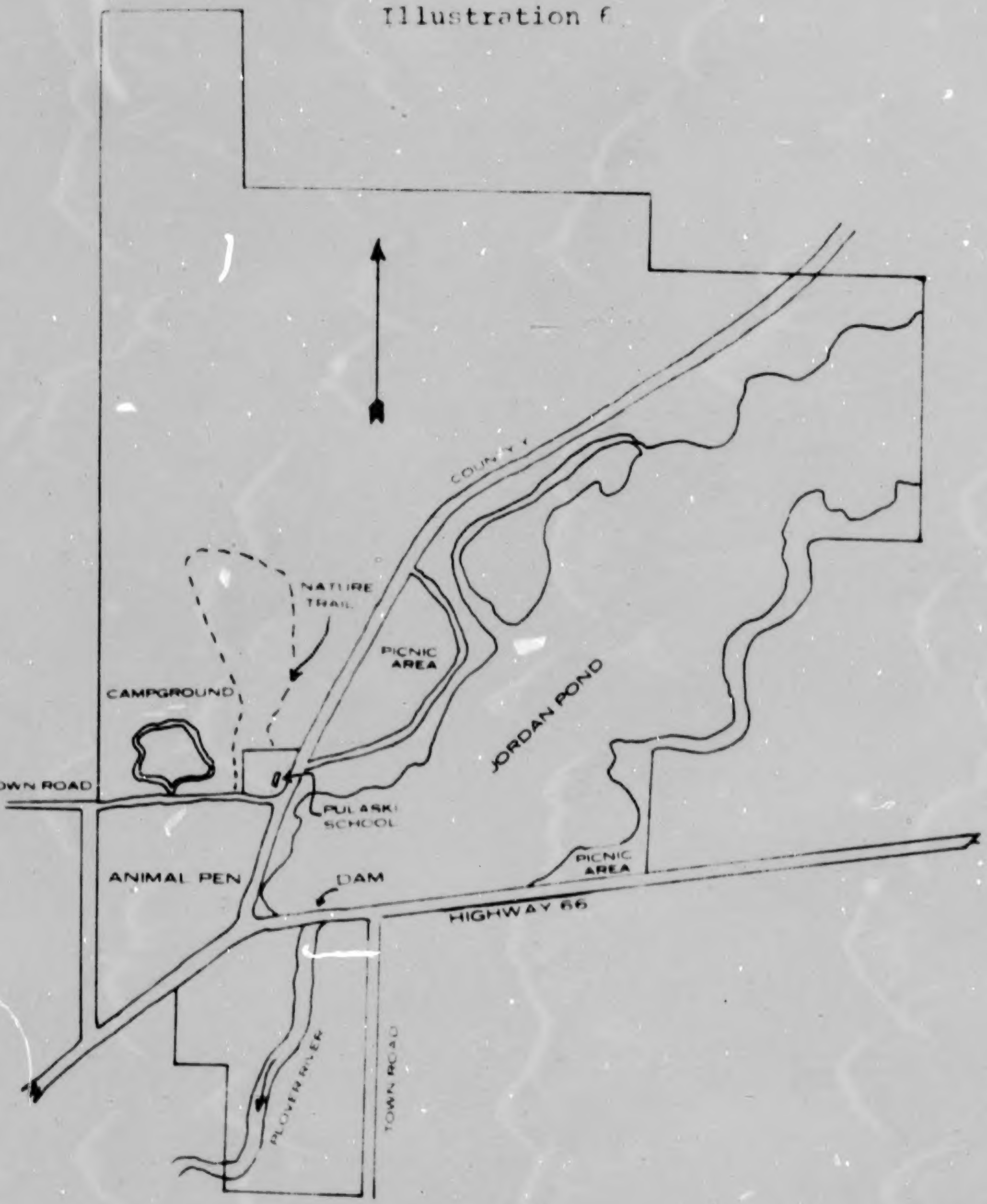
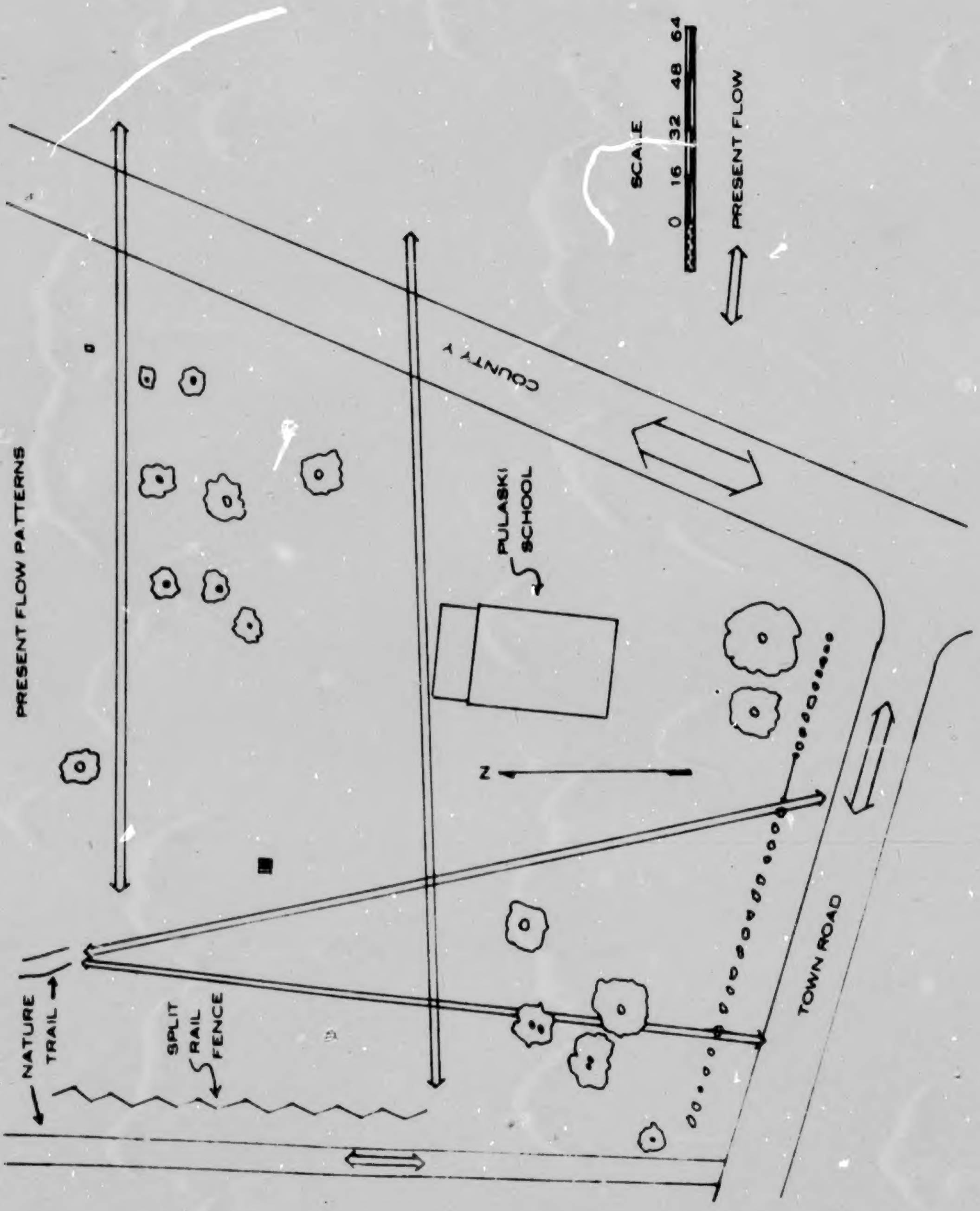

COUNTY Y
NATURE TRAIL
PICNIC AREA
CAMPGROUND
TOWN ROAD
PULASKI SCHOOL
JORDAN POND
ANIMAL PEN
DAM
PICNIC AREA
HIGHWAY 66
PLOVER RIVER
TOWN ROAD

Illustration 7

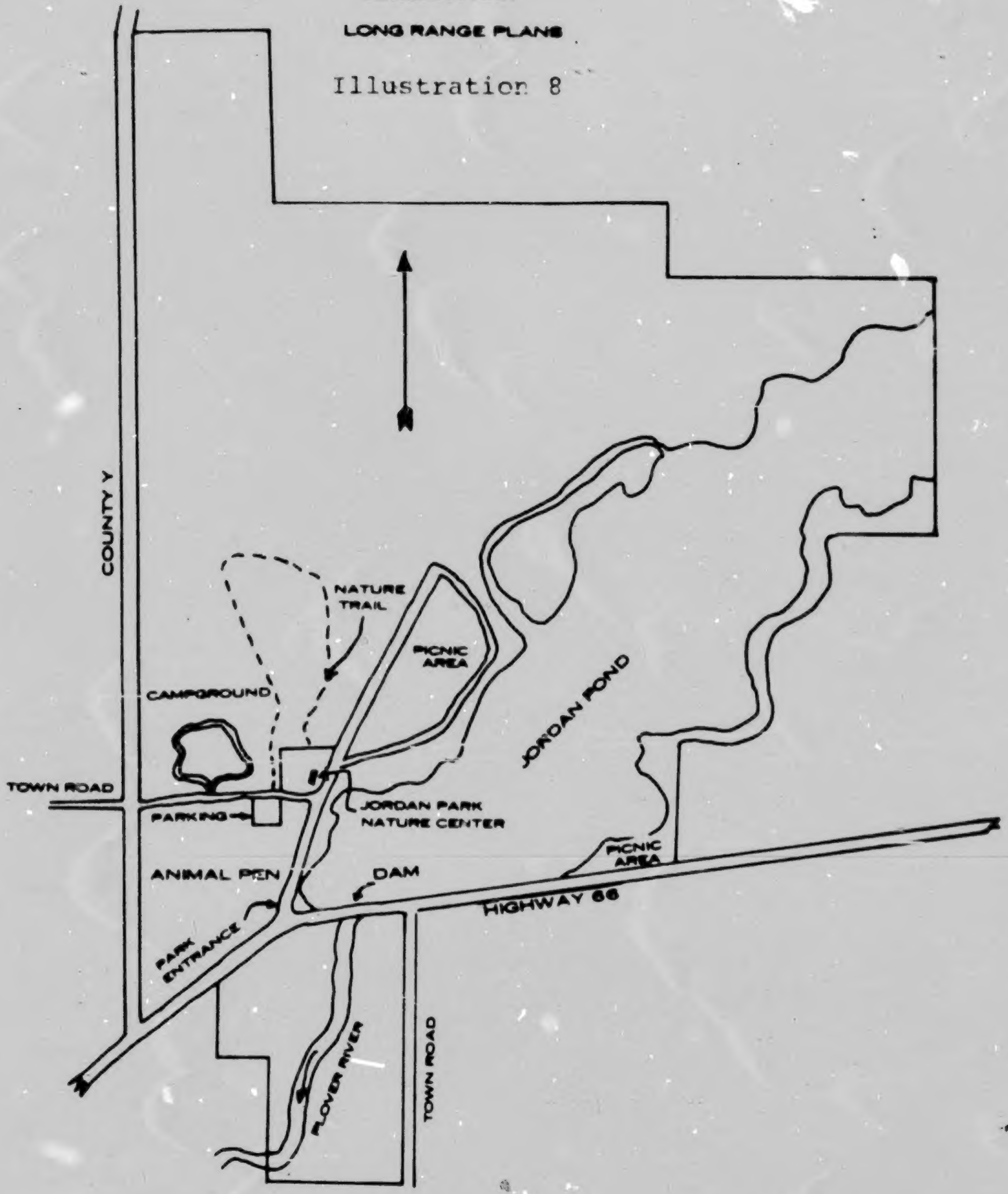
PRESENT FLOW PATTERNS


NATURE TRAIL
SPLIT RAIL FENCE
PULASKI SCHOOL
COUNTY Y
TOWN ROAD
N
SCALE
0
16
32
48
64
PRESENT FLOW

JORDAN PARK

LONG RANGE PLANS

Illustration 8


COUNTY Y
NATURE TRAIL
PICNIC AREA
CAMPGROUND
JORDAN POND
TOWN ROAD
PARKING
JORDAN PARK NATURE CENTER
ANIMAL PEN
DAM
PICNIC AREA
HIGHWAY 66
PARK ENTRANCE
PLOVER RIVER
TOWN ROAD

that the group may come in contact with. Non-organized visitorship can: 1) use the area for a place to relax before or after a hike, 2) listen to the audio-station and, 3) enjoy the vegetation on display. The gentle swelling in the path at this staging area creates a pooling effect. There is a release that people feel when given a widened area to experience and are no longer swept along a tidy path (Simonds, 1961). This use of space invites attention to the features found around it.

A cutback trail should be added in the woods between the trail head and the ending of the hiking trail. This would allow the hiker the flexibility of going to the parking lot or returning to the nature center. It should have a sign informing the hikers of this option. These short range plans can be seen on Illustration 9.

Significent Views

As a visitor enters the park, the first view of the nature center is very impressive. The brick structure is framed by two stately oak trees, giving a great sense of strength and stability and showing a compatability between man and nature.

Upon parking the car, the visitor comes in contact with the rock fence in front of the nature center. The rocks are intermingled with plantings, providing an aesthetically pleasing barrier to people, and a habitat for wildlife. Towering above the fence are several more stately looking oak trees.

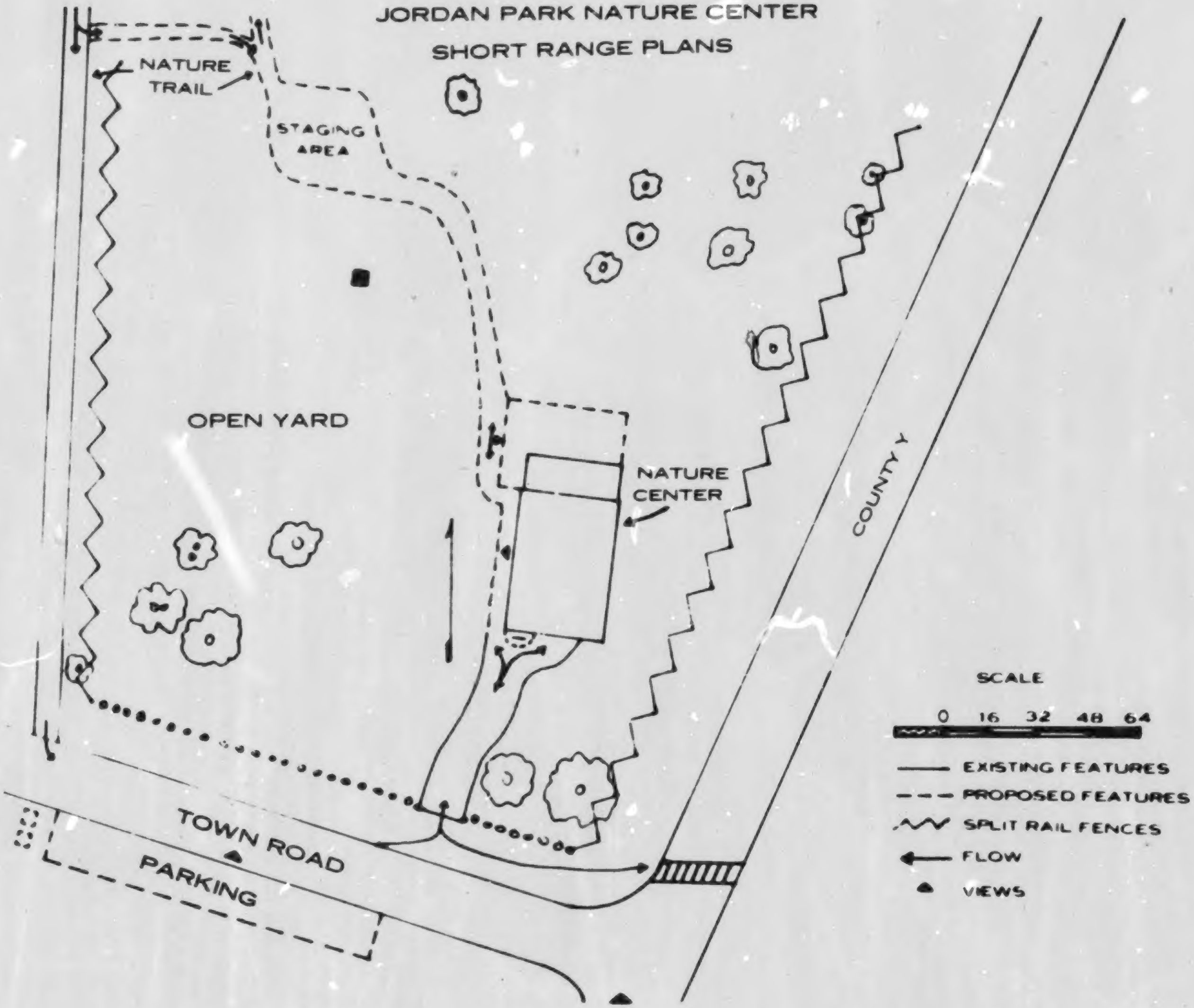
From under the trellis, the visitor can also get a view of the oaks to the west of the nature center. Here, the view is a bit different. It is framed by the brushy bittersweet overhead and by the fragrant sweet fern along the ground. The sides are framed by rustic 4" x 4" posts supporting the trellis. Beyond the solitary oaks is the oak forest mixed with scattered pines and bordered by a rustic split rail fence. These views can be pinpointed on Illustration 9.

Fences and Hedgerows

In order to control flow in and around the nature center, rustic split rail fences and plantings will be used. The split rail fences and plantings will define boundaries of travel. The hedgerows and fences will be planted with prickly shrubs, mainly to reduce the problem of people climbing over or going through the boundaries.

Illustration 9

JORDAN PARK NATURE CENTER
SHORT RANGE PLANS


NATURE TRAIL
STAGING AREA
OPEN YARD
NATURE CENTER
COUNTY Y
TOWN ROAD
PARKING
SCALE
0 16 32 48 64
EXISTING FEATURES
PROPOSED FEATURES
SPLIT RAIL FENCES
FLOW
VIEWS

The rustic split rail fences should be placed along the east ditch line to control flow across County Y and to prevent people from walking past the windows of the warming room when going from campground to beach and back (see Illustrations 7 and 9). We believe that this fence will aid people to cross County Y at the crosswalk to be constructed at the corner of the town road (see Illustration 9). This crosswalk should be marked on the pavement and proper signs should be placed along the highway.

The west split rail fence is mainly to hide the people who are ending their trail hike from the view of those within the nature center. It may also serve as a barrier to keep more adventuresome persons from straying into the open area (Illustration 9).

The trellis and plantings along the west side of the building were planned to keep the trail hiker close to the building. View angles were taken from the windows and we decided that if we kept the hikers close to the building, they would not be seen by those looking out the windows. The trellis is covered by vegetation to create a more natural look and to provide a habitat to attract wildlife. The trellis planting scheme should be curved using organic lines to provide a setting which is more compatible with nature.

The present rock fence along the front of the nature center should encourage people to use the trellis pre-trail or to lead them into the nature center. Hopefully it will prevent them from getting out of their car and walking directly across the yard to the trail head spoiling the view of the people from the alcove windows.

PLANTING SCHEME

Stone Fence

As the visitor enters the nature center from the parking lot, glacial boulders, with flowering trees and shrubs spaced intermittently, will tantalize him with glimpses of the open yard. Once established, bird and wind deposition will bring fruiting brambles (*Rubus spp.* and *Ribes spp.*) to the rock hedgerow. To further attract wildlife, the plantings in the hedgerow will be taken from a master list of indegenous trees and shrubs (Table 3). Suggestions for species composition should be interpreted loosely. Various species on the list are attractive to animal species to differing degrees. The idea is to promote wildlife habitat, but not to go broke feeding deer and rabbits fresh nursery stock.

TABLE 3

Flowering and Fruiting Shrubs

Common Elderberry	Sambucus canadensis
Red Elderberry	Sambucus pubens
Four lined Honeysuckle	Lonicera involverata
Northern Honeysuckle	Lonicera villosa
Smooth Juneberry	Amelanchier laevis
Swamp Juneberry	Amelanchier intermedia
Running Juneberry	Amelanchier stolonifera
Low Juneberry	Amelanchier humilis
Roundleaf Juneberry	Amelanchier sanguinea
Snowberry	Symphoricarpos albus
Coralberry	Symphoricarpos orbiculatus
Privet	Lingustrum spp.
Red-osier Dogwood	Cornus stolonifera
Tartarian Honeysuckle	Lonicera tatarica
Arrowwoods	Viburnum spp.
Highbush Cranberry	Viburnum trilobum
Squashberry	Viburnum edule
Winterberry	Ilex verticillata

Fruit Trees

Serviceberry	Amelanchier aborea
Black Cherry	Prunus serotina
Choke Cherry	Prunus virginiana
Pin Cherry	Prunus pensylvanica
Sour Cherry	Prunus cerasus
Wild Crab	Pyrus ioensis

Trellis

The species chosen for the trellis on the west side of the building over the walkway is American bittersweet (Celastrus scandens). This plant is well suited to existing shade and moisture conditions and provides abundant fruit attractive to wildlife. In addition, the fruit will persist on the vine through winter if it isn't eaten by birds. This not only extends the period of wildlife use but solves the maintenance problem of ripe and rotting fruit on and along the pathway. The flower is small and green and will not attract the honey bees from the nearby bee display to the extent many other fruiting vines would. It also grows by winding and doesn't have tendrils that would enable it to cover the building as other climbing vines would. Regular maintenance will be required as this handy vine grows rapidly and to a considerable size.

To accent the border of the trellis path, low shrubs were chosen as they would not interfere with the view of the smaller visitors. Sweet fern (Comtonia peregrine) is a common native species and would be striking right next to a heavily used path. Its characteristic pungent odor is unmistakably reminiscent of the outdoors.

Shrub Screen

Between the trellis pre-trail and the staging area, there will be (on the east side) a screen of eye-level flowering shrubs. Their main function will be to screen traffic from the front of the warming room (Illustration 10). The shrubs must be set back from the trail a minimum of ten feet, safely away from most stinging insects.

Staging Area and Plantings

Native woody vegetation plantings will be situated around the staging area. The theme for these plantings will be the diversity of ecosystems found in Wisconsin. Each of three forest types will be represented (Table 4). Some of the trees suggested are indigenous and can be transplanted from elsewhere in the park. The only species that may be outside of its natural range is black walnut (Juglans nigra), but the fringe of that range is not well defined. It will grow 30 miles to the south. Other species, while they may not occur naturally within the park, can be established as the park is well within their geographic ranges.

Illustration 10

PLANTING SCHEME

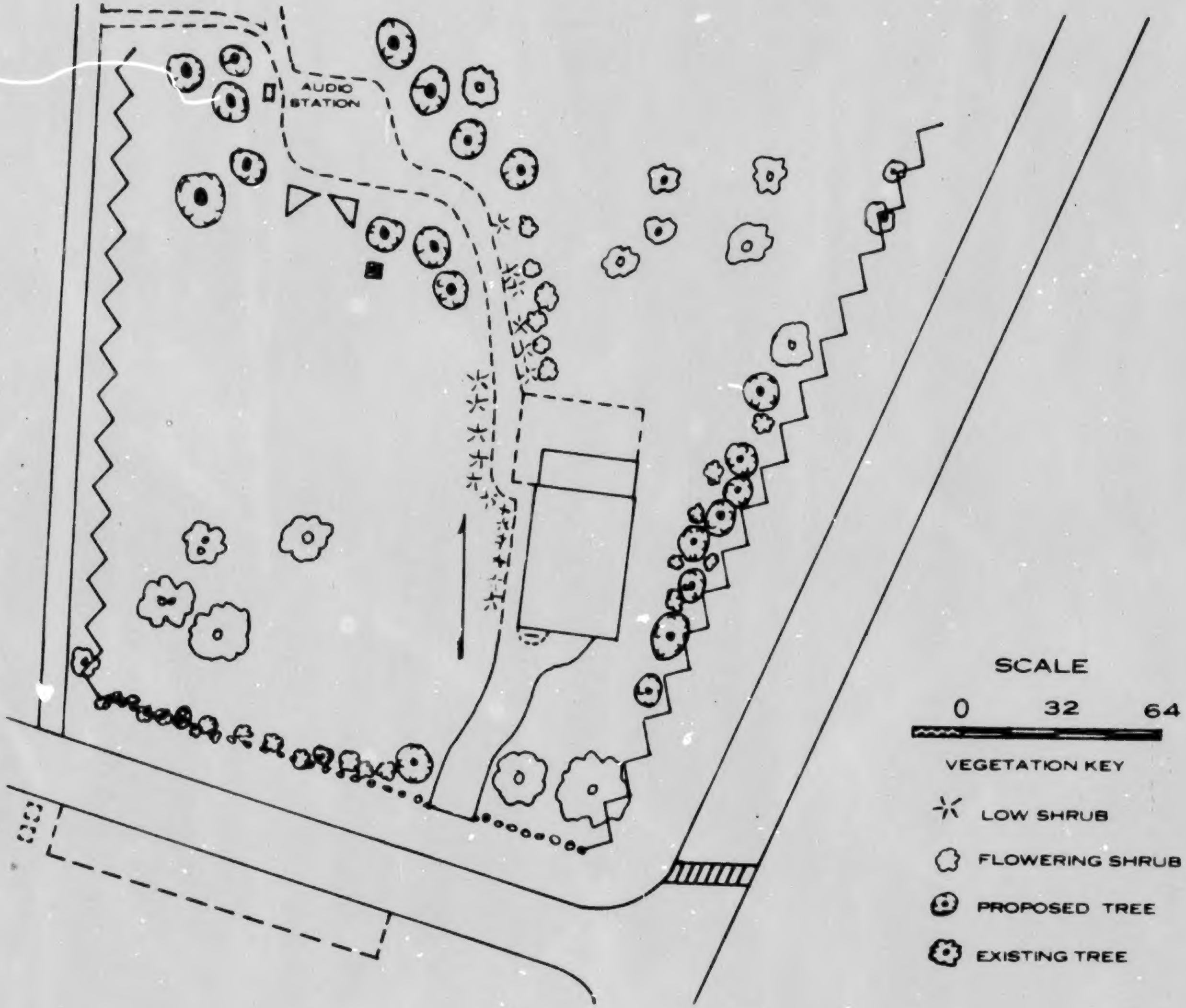

AUDIO STATION
SCALE
0
32
64
VEGETATION KEY
LOW SHRUB
FLOWERING SHRUB
PROPOSED TREE
EXISTING TREE

TABLE 4

Northern Boreal Forest

- Balsam
  - Abies balsamea
- White Spruce
  - Picea glauca
- Hemlock
  - Tsuga candensis
- White Cedar
  - Thuja occidentalis
- Mt. Holly
  - Nemopanthus mucronata

Central Mixed Forest

- White Pine
  - Pinus strobus
- Red Pine
  - Pinus resinosa
- White Birch
  - Betula papyrifera
- Quaking Aspen
  - Populus tremuloides
- Hornbeam
  - Ostrya virginiana

Southern Hardwoods

- Ironwood
  - Carpinus caroliniana
- Red Elm
  - Ulmus rubra
- Red Maple
  - Acer rubrum
- Sugar Maple
  - Acer saccharum
- Black Walnut
  - Junglans nigra

A vista of the open yard will be maintained, recalling that some areas of the state are natural prairies. Soil and climate limitations prohibit establishment of true prairie species. Maintenance of this area will have to include periodic removal of encroaching woody species. This could be accomplished by mowing or with controlled burning. Under these conditions annual forbs and flowering weedy species will be established.

Herb Garden

Along the south side of the staging area there is space provided for herb or flower gardens. Some of the possibilities for this display include: 1) the labeling of indigenous flowers (so that non-guided visitors can identify them when they see them on the trail), 2) species utilized by the Indians, and 3) folk remedies and edible plants that might be found anywhere. This display is very flexible; it could be changed annually or removed and seeded to prairie when desired.

Sound Barrier

To insulate the nature center from the noise of Highway Y, we plan to plant a row of white ash (*Fraxinus americana*) along the fence on the east side of the building. White ash would serve a dual purpose on the east side. In winter the leaves are gone and the morning sun is let through to warm the building. In summer the long petioles allow the leaves to move with great freedom and mechanically absorb sound evergy from the highway. Spaces between the ash trees would be filled with flowering trees and shrubs (Table 3).

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Ashbaugh, Byron L. and Raymond J. Kordish. 1971. Trail Planning and Layout. National Audubon Society. New York, New York.

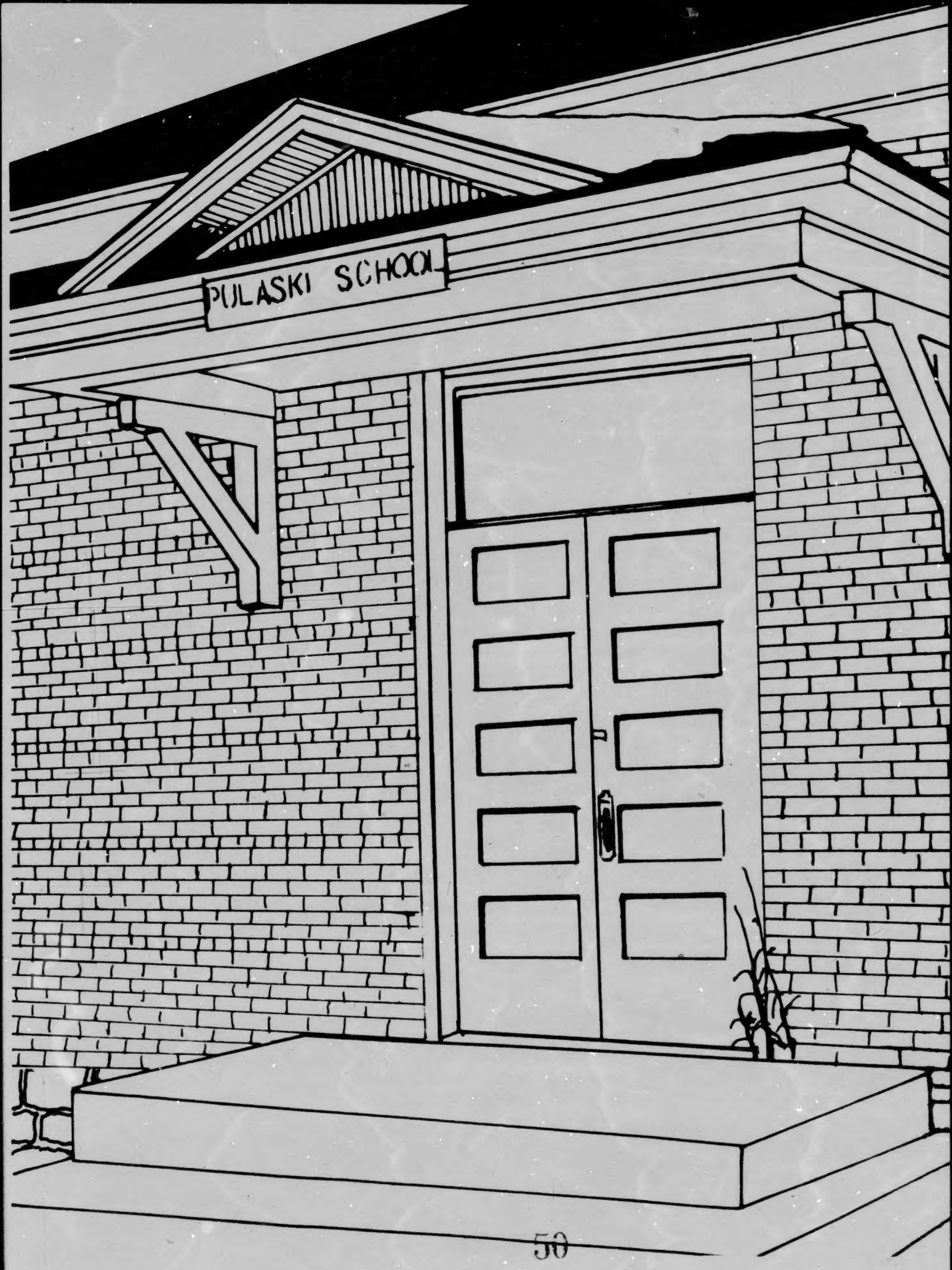
Rombold, Charles C. 1963. Signs and symbols for park and recreation use. National Recreation and Park Association. Management Aids. Bulletin No. 39.

Simonds, John Ormsbee. 1961. Landscape Architecture. McGraw-Hill Book Company. New York, New York. 158-160.

INTERIOR CONCEPT

Albert Savastio

Thomas J. Perkins


PULASKI SCHOOL

The interior concept includes the layout of the exhibit room, the naturalist workroom and office, bathroom facilities, warming room, display placement, and the traffic or flow pattern throughout the building. The arrangement of these areas and functions should be compatible. Further, the creation of visual magnets and visual baffles will direct and influence the traffic flow of people in the center. In order to achieve our objectives we have tried to show how the original floor plan of the Pulaski School (Illustration 11) should be modified. A sketch of the modified interior (Illustration 12) will help clarify our explanations.

Flow Pattern (Illustration 12)

The flow pattern should be suggestive rather than constraining. It should minimize crowding and prevent bottlenecks of people at any one area or exhibit in the building. The general pattern will be a circular counter-clockwise flow through the building. Flow patterns of visitors can often be compared to the flow of water down a stream. If water in a stream gets backed up, unstable conditions in the flow can occur. By analogy, if people walking through the center were to switch direction abruptly there would be crowding plus pushing and shoving. A good flow pattern will insure the chances of the visitor seeing everything with a maximum of convenience.

Functional Considerations for the Flow Pattern

The visual baffle can influence the flow pattern by guiding people in one direction, while diverting them from another. The nineteen foot wall that greets the visitor as he enters the building will serve as a visual baffle (Illustration 11, Point 1). It will channel people to the right as they enter. A narrow and obscured exit will discourage them from going to the left. We have now initiated the major flow pattern for the interior. This baffle will not stay in its present position, but it will be slanted toward the west side of the building. This will serve to widen the entrance into the exhibit room. It will also serve as a wall for the audio-visual room (Illustration 12).

Once the visual baffle has been established, we have to decide how we want to utilize the space between the entrance of the building and baffle. This area should serve as a foyer. There will be a place to hang coats immediately to the right as one comes in. A pay phone might be in order

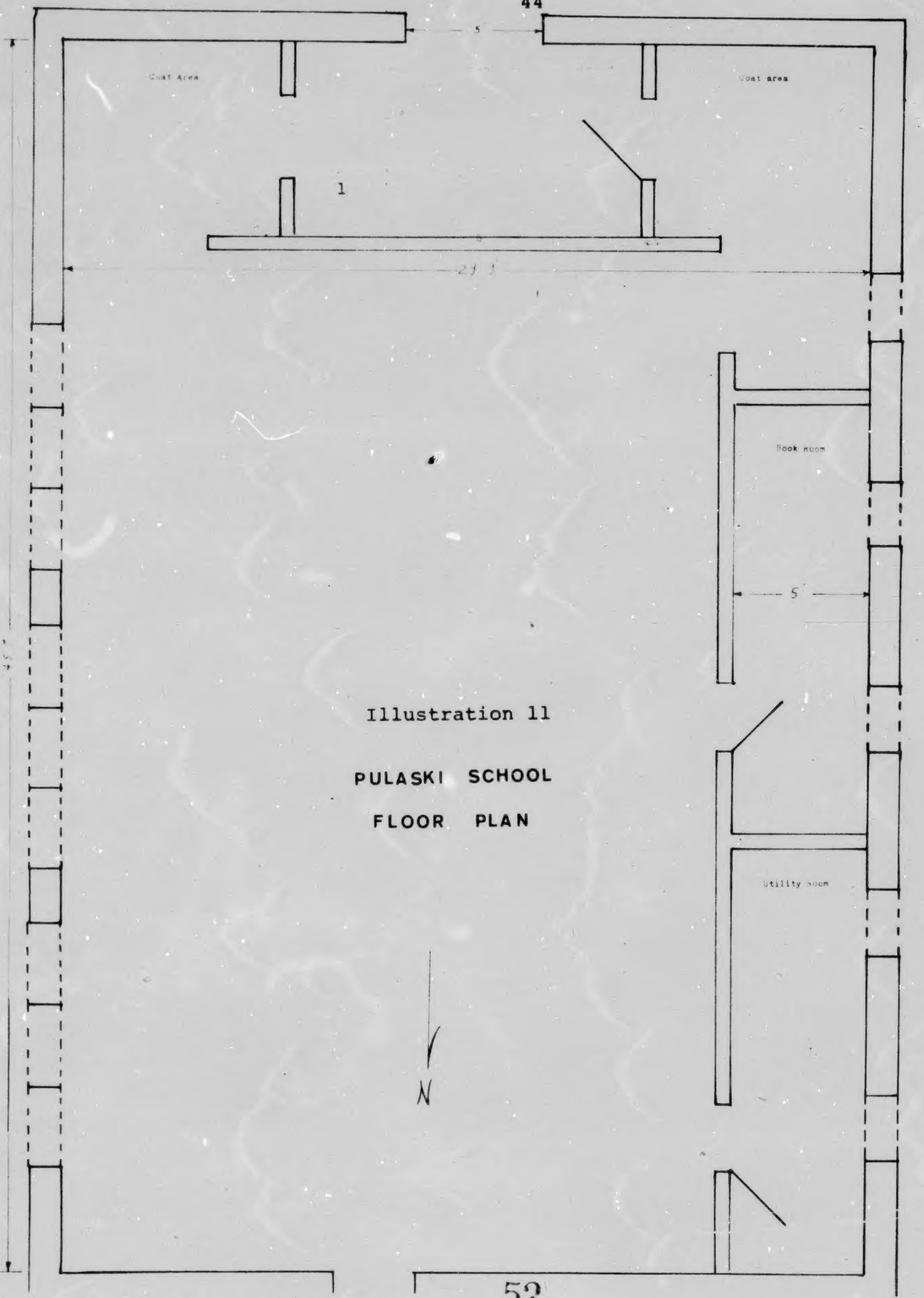
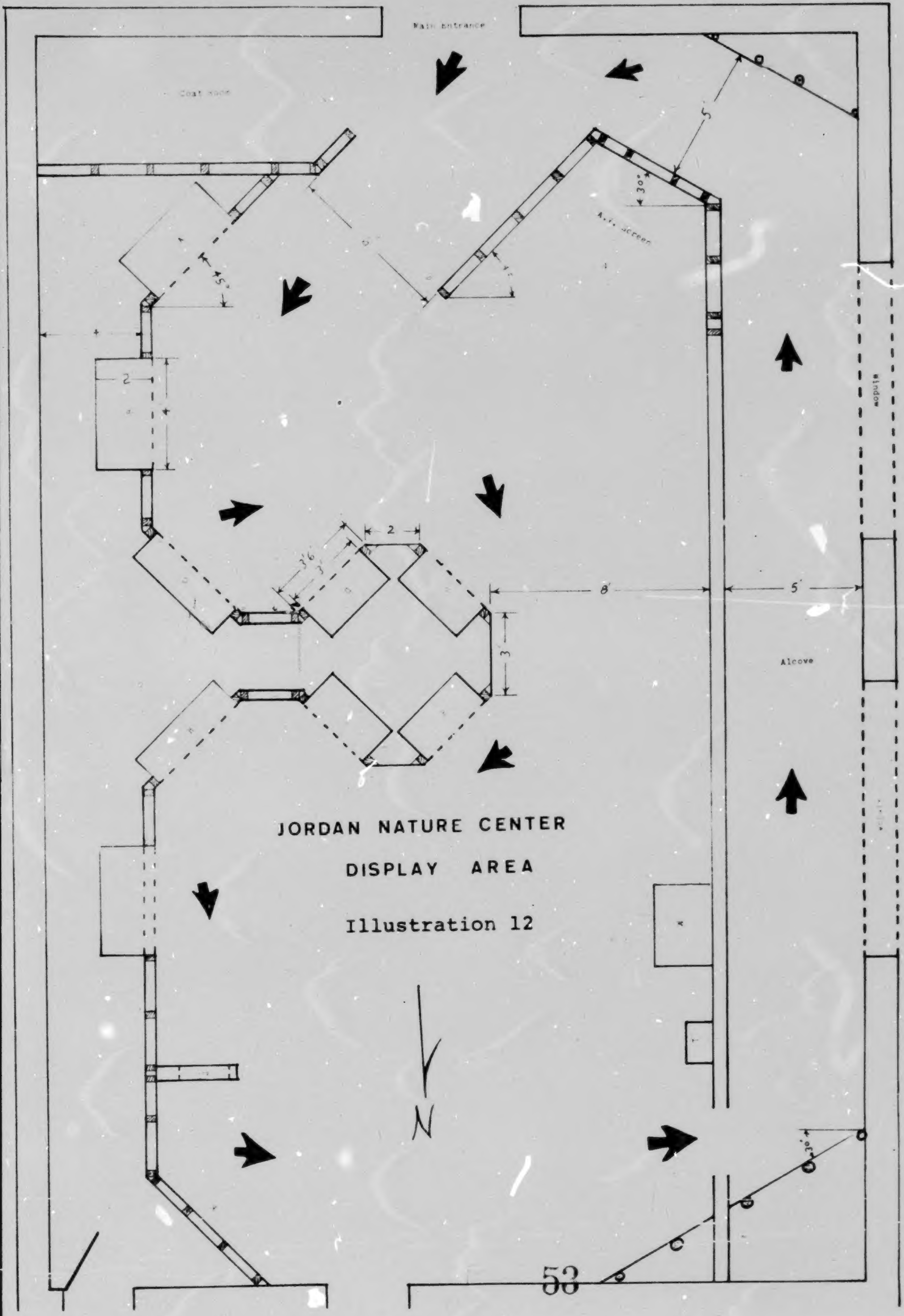

5
Coat Area
Coat area
1
27' 3'
45'
Book Room
5'
Utility Room
N

Illustration 11

PULASKI SCHOOL

FLOOR PLAN


Main Entrance
Coat Room
A.V. Screen
5'
30°
45°
45°
2
3'6"
3'
2
8'
5'
3'
window
Alcove
30°
N

JORDAN NATURE CENTER

DISPLAY AREA

Illustration 12

here since the nature center is located rather far away from town. Other than possibly adding a water fountain, this space will be free and uncluttered. No exhibit will be placed here because it would create a bottleneck, hindering visitor traffic. We will make use of the high ceiling to construct a beamed archway in the foyer. Although the purpose of the foyer is strictly functional, the beamed archway can reinforce the mood of a nature center by giving a rustic effect that is often associated with nature and the outdoors.

Placement of Facilities

Facilities include bathrooms, naturalist's office, and workshop-storage area. In order to incorporate these facilities, certain changes in the building itself are necessary. As it stands now, there is a north room adjoining the main building that is roughly twenty-nine feet long and seventeen feet wide. This room will be torn down and a new and larger sub-structure will be built there. This new structure will be expanded ten feet out on the west side of the building to accommodate the restrooms (Illustration 13). As one walks from the exhibit room, there will be one step leading down into this area. On his right will be the naturalist's office and on his left a workshop-storage area. The maintenance function will be filled by the workshop area, which will contain the furnace for heating the bathrooms, with a sink and refrigerator for servicing the animal exhibits.

The new extension will also contain a warming room. An open walk between the office and workshop will lead into the warming room. This plan lends itself well to the general flow pattern of the interior, and it doesn't take away any space from the exhibit area. The restrooms are within easy access to visitors inside the building, and they can also be entered from the outside by people using the nature trail. This results in a more compatible flow pattern where people wouldn't need to walk all the way through the nature center to use the bathrooms.

There will be a door between the naturalist's office and a hidden catwalk behind the live exhibits (Illustration 13, Point 1). With this arrangement, the naturalist will have access to the animal cages for cleaning and feeding.

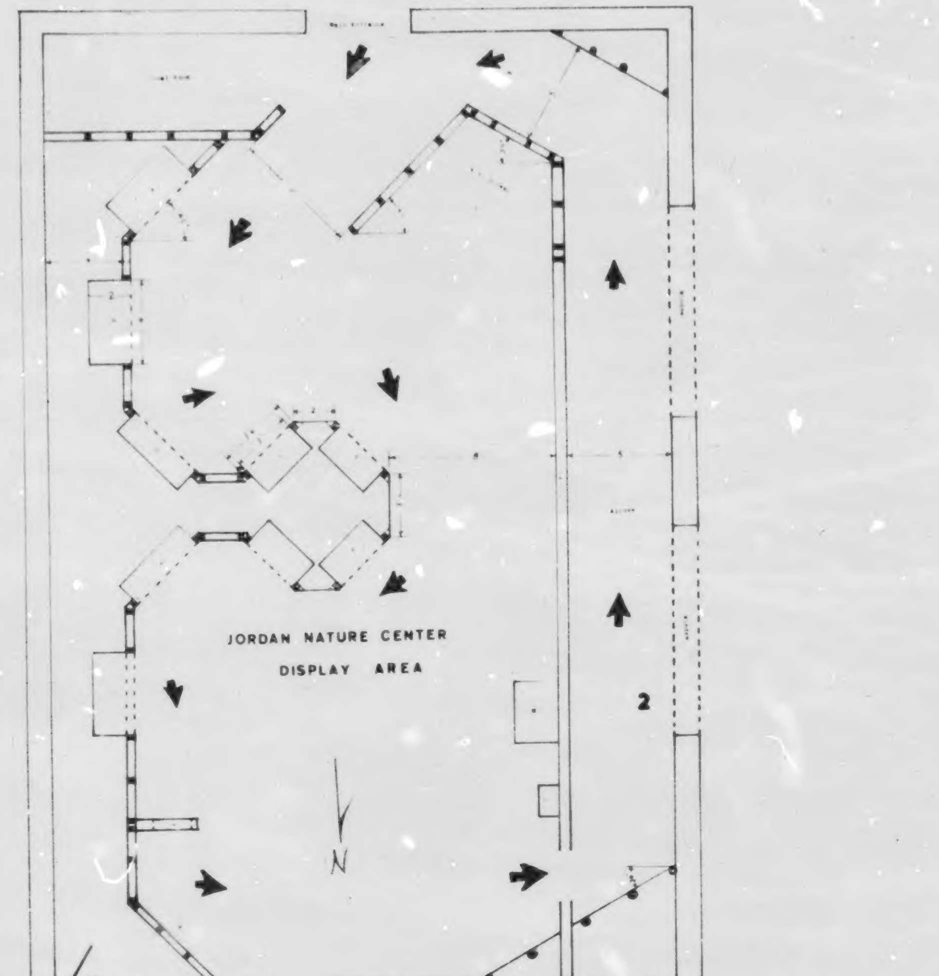

JORDAN NATURE CENTER
DISPLAY AREA
1
2
N

Illustration 13

The Warming Room

The way the plan stands now, there will be one step leading down as the visitor leaves the exhibit room and walks past the workshop and office. Then there will be one more step leading down to the warming room. Because we slightly lowered the ground level each time, one will be able to see part of the warming room from the exhibit room. We could take advantage of this by placing a fireplace in view of the exhibit area. The fireplace would be a visual magnet drawing people into the warming room (Illustration 14). In planning the warming room, it is necessary to list the activities that will go on there. The room will have a dual function. Most of the time it will be used for relaxing, chatting or reading. The room is also large enough for special lectures and slide shows. We must plan the room with these two functions in mind, and make certain they do not clash with each other. Since the room is not especially large it should be sparsely furnished. Benches, which can be moved against the wall when not in use, can be used for large lectures.

No large furniture should be built in because it might detract from the flexibility of the room. Any furniture that we use should be lightweight. Folding chairs and tables will aid this purpose. A large reading table can be made by pushing smaller folding tables close together. When a lecturer or film is presented, excess furniture can easily be moved to the storage area.

The fireplace should continue all the way up to the ceiling so that it stands out more as a visual magnet. On each side of the fireplace will be a double set of windows that can be cranked open or closed. This will ventilate the room in summer.

Because the exterior flow pattern and plantings direct people away from the rear of the building and toward the nature trail, the windows in the warming room would give an undisturbed view of the outside.

Furniture should be grouped so that the traffic pattern will not interfere with conversation. This means that the area between the warming room entrance and the open walk leading to the restrooms should be left free and uncluttered. Also the area between the fireplace and the entrance to the warming room should be left open so visitors can see the fireplace from the exhibit room.

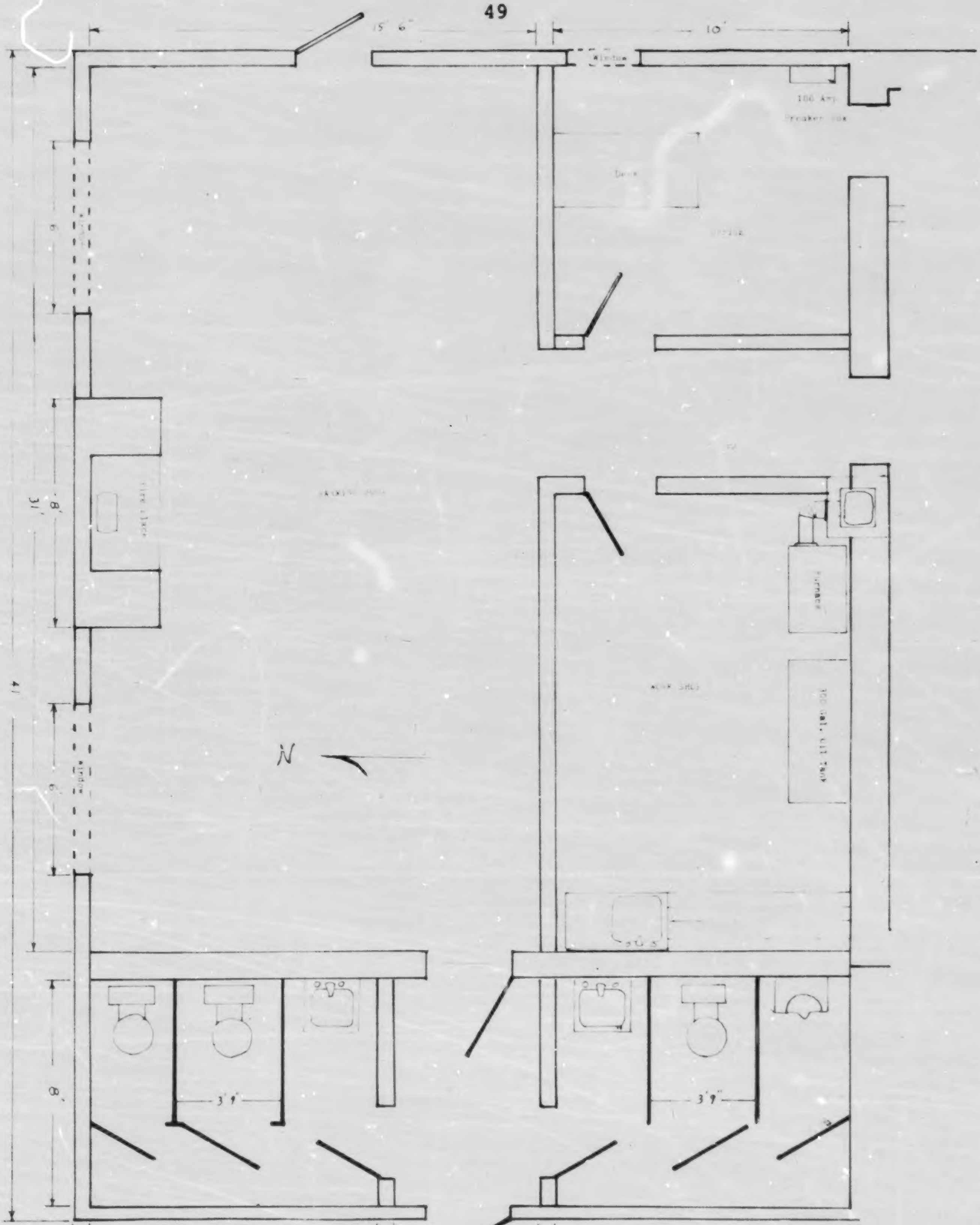

15' 6"
10'
Window
100 Amp
Breaker Box
Desk
Office
6
Window
31'
8'
Fire place
Work Shop
Furnace
300 Gal. Oil Tank
41'
N
6'
Window
8'
3'9"
3'9"
10'
5'
10'
27' 6"

Illustration 14

Color can create the atmosphere and set the mood for the room. Bright colors are stimulating. They can be used effectively in small areas, but they become overpowering when used in large amounts. Pale colors, such as yellow and white, suggest sunshine. They look well on large expanses of wall. Deep colors are well-suited to floors because they "stay down" visually, making a floor seem substantial. Warm colors, red, orange, and yellow, add cheerfulness to rooms on northern exposures. Color can change the apparent size of the room. To make the warming room appear larger, it should be painted a pale, cool color. The walls will seem to recede or move farther away.

Shelves will be built on the west side of the warming room. These shelves can be stocked with field guides and pamphlets about the nature center. Pamphlets could be prepared that relate to some aspect of the window view, such as a tree flowering calendar.

The view from the warming room should be one that allows a person to freelance with his eyes. Rather than having a major view, there will be many small things to look for. There will be feeding stations for small mammals and birds, bird houses, and various types of plantings. Nothing will dominate or stand out. Since there will be no caged birds or mammals in the nature center, we can fill the gap by creating an outdoor situation that would attract these animals within the view of visitors.

Placement of Windows Throughout the Building

The windows that exist presently on the east wall of the building will be bricked up. An interior wall will be built four feet from the east wall. This will form a narrow catwalk area that will service live exhibits in the view wall (Illustration 13, Point 1). The interior wall will solve the noise problem caused by the proximity of the county road on the east side of the building.

The windows in the alcove (Point 2) will not affect the interior with incoming light. The view from the alcove windows, on the west side, will relate the exterior concepts to the interior. Most of the alcove will be devoted to interpretation of the exterior view.

A window in the naturalist's office will make it more liveable, and a view of the road will give him an idea of how crowded the center will be.

Techniques Used to Provide a Visual Change of Pace for Visitors

I. Passive Displays
   A. Panels
   B. Maps

II. Active Displays
   A. Live Exhibits
   B. Automatic slide projectors with rear projection screen

We have used all of the above techniques to give variety and stimulate interest. Different themes will be represented on each side of the exhibit room. Where displays are placed will depend on their size, and how they fit into a particular theme. For instance, the theme on the east side of the building will be that of a living wall. It will include game fish, reptiles, amphibians, and live plants. On the west wall of the exhibit room, panel and table displays and an alcove will be present. The alcove will constitute a separate theme dealing with forest succession.

It is important to include exhibits that allow for some type of visitor participation. Marshall McLuhan, in his book Understanding Media: the Extensions of Man (1964), makes a distinction between two basic types of media. He describes a hot medium or display as being low in participation. This type of display has very complete information and would not leave much to be filled in or completed by the audience. A map, panel, or photograph would be examples of a hot medium. A cool medium is high in participation. The information isn't complete and must be filled in by the audience. This type of display would be illustrated by a quizboard where the visitor must participate by choosing the correct answer.

McLuhan also states that one of the hallmarks of the present-day electronic age is the need for involvement. People desire an in-depth experience where they can use all their senses. For instance, a display of materials with different aromas and textures would stimulate smelling and touching.

In his book, McLuhan notes the increasing use of audio-visuals in all facets of education. This trend can be illustrated by an experiment that was done at the University of Toronto. Four groups of students were given the same information at the same time. One group received it by radio, one from television, one from lecture, and one read it. Each group was exposed to the information for a half hour. Each was asked to fill in the same quiz afterward. The students who received the information by television and radio performed better on the quiz than students receiving the information by lecture and print.

To make understanding easier, exhibits should emphasize audience participation. We should try to provide situations where a person may simply push a button, turn a crank, or walk into a life-sized display and become part of the exhibit. Some of the larger museums feature exhibits where the visitors may see themselves in a color television, stroll down a 1910 street, or watch baby chicks hatch (World Book Encyclopedia, 1965). Although we can't be as elaborate as some of these larger, well-funded places, we can still apply the same philosophy. We shouldn't depend on any uniform method of display. Exhibits should be designed individually and presented with variations in architectural form, color and light. By using different styles and structures for each theme, the visitor is more likely to retain what he has seen.

Considering the Visitor View

One of the main things to remember about the visitor is the short time span he will devote to each exhibit. Displays should be planned to emphasize basic facts and feelings you wish the visitor to carry away. To avoid fatigue, a place to sit down and rest should be planned as part of the regular traffic flow. The warming room addresses itself to this problem. Due to lack of space, we will confine our seating only to the warming room.

Considering how a person sees when he views a display is very important. Convergence (when both eyes see as one) is brought about by certain muscles. These eye muscles get tired if held in the same position for a long time. If there is no variation in the depth of object placement, the muscles that control focusing of the eye will tire quickly (Neal, 1969).

On Viewing the Animal Displays

In animal displays one should guard against overembellishment. An exhibit of overwhelming beauty can detract the visitor's attention from the animal. Live animals should not have to compete with geometric shapes, shiny aluminum, or bright colors. By the same token, the exhibit shouldn't be limited to a sterile wooden shell behind glass. Such arrangements provide good environmental control and are very easy to clean, but they tend to resemble a clinical research laboratory. A simple but natural setting is the most compatible arrangement. For instance, the animal's water dish can be recessed into an old log. The log would lend character to the cage and hide the dish as well. One should also look at the relationship between the animal's size and the cage it is occupying.

Alternatives in the Flow Pattern

Displays should be arranged to offer people a choice as they walk through the building. There shouldn't be an imposed order to viewing displays. As visitors approach the rear of the exhibit area (Illustration 13) they have the following alternatives: 1) they can head toward the warming room, or 2) they can enter the alcove, or 3) they can go to the table displays. The alcove, by its very nature, can draw the people to the far side of the exhibit room. People have an inherent curiosity to enter dark areas, and a large sign at the entrance of the alcove will attract visitors to it.

Use of Color and Light to Enhance Interior and Displays

Walls, floors and ceilings should be considered a background and compliment rather than compete with displays. By painting the ceiling black, the pipes and angles of the beams will virtually disappear. A dark-colored display table will make light-colored materials appear larger, and a light-colored display table makes dark materials look smaller. Choice of color can convey a theme and suggest an environment or time period. For instance, green can suggest a plant or forest theme.

Properly directed light can create a mood. Because the windows on the east side of the nature center will be blocked off, we can more easily control the lighting conditions of the exhibit room.

Possible Conflicting Uses

The view from the alcove windows on the west side may be obstructed by people using the nature trail (Illustration 13, Point 2). The problem is how to provide a dual use between the nature trail and interior view. Since the alcove windows will be seven feet above the ground, a trellis can be built very close to the windows but not extending above the window sills. In this way the people going to the nature trail would be walking beneath the view of the windows. People inside would not see those outside.

If special lectures are being given in the warming room while visitors are in the exhibit room, there may be interruptions from people wanting to use the restrooms. Both entrances to the warming room could be blocked off so that people could only get to the restrooms from the outside.

We have tried to plan an interior that minimizes conflicts and permits separate functions simultaneously. We have also planned for the naturalist's convenience. His office is located in the middle of the building. In this way the naturalist will have access to all parts of the building. For instance, he can easily get to the fish tanks through a door from his office that leads to the catwalk behind the tanks. The naturalist's office is also close to the workshop for display construction and to the exhibit room for public contact.

Final Note

We can have a progressive nature center only through variety and updating of exhibits and themes. We should plan exhibits that can easily be removed and replaced with something else. The interior should serve as a platform from which we are constantly introducing new concepts and presentations. In short, we should design with flexibility in mind.

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McLuhan, Marshall. 1964. Understanding Media: the Extensions of Man. McGraw-Hill, New York.

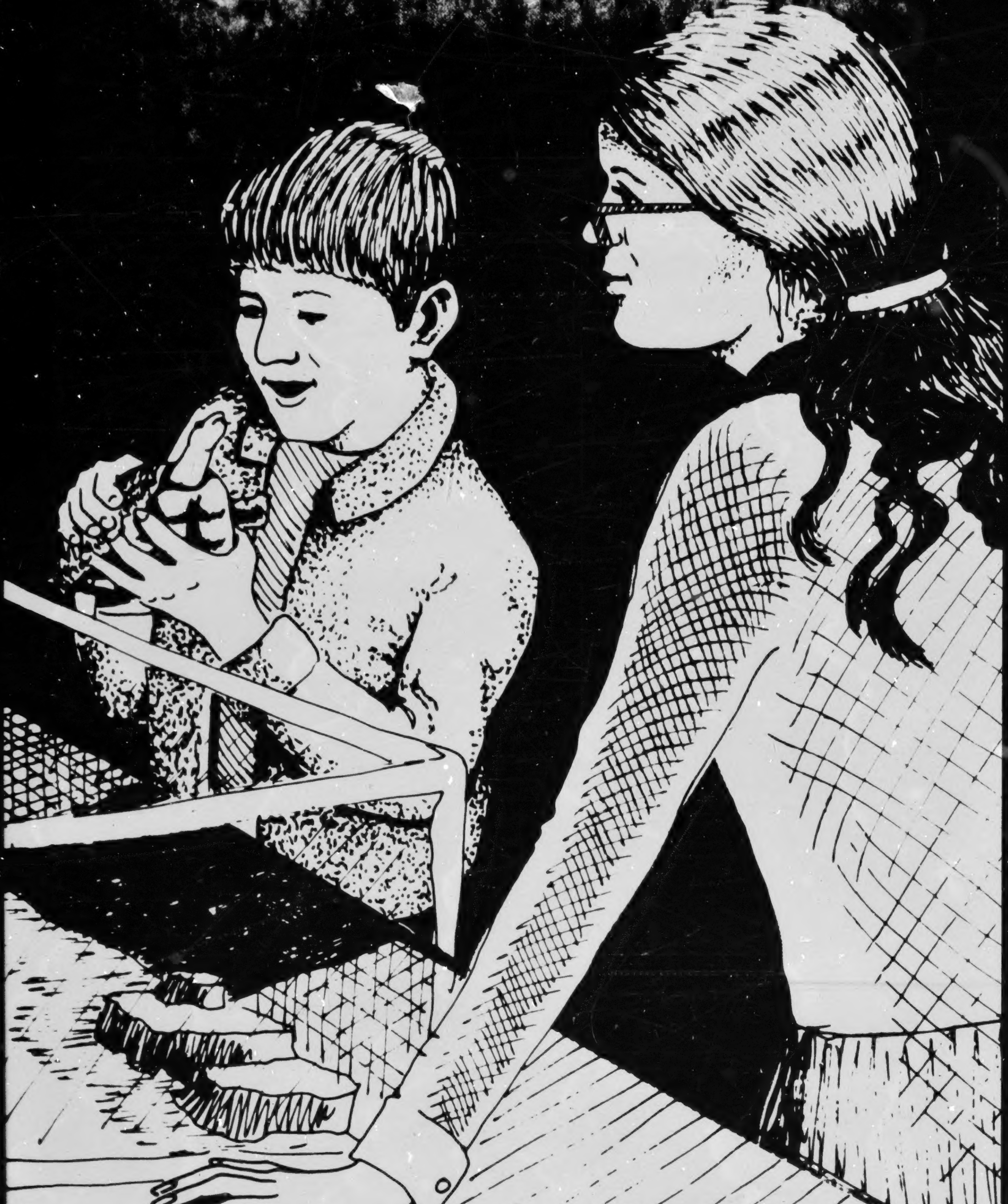
Neal, Arminta. 1969. Help for the Small Museum. Pruet Press, Boulder, Colorado.

AURA
AND
DISPLAYS

Edward C. Marks

Donald E. Westover

[illegible]



> "Architecture, by now, was mine. It had come by actual experience to mean to me something out of the ground of what we call 'America', something in league with the stones of the field, in sympathy with 'the flower that fadeth, the grass that withereth,' something of the prayerful consideration for the lilies of the field that was my gentle grandmother's."
>
> Frank Lloyd Wright
> (Kaufmann, Raeburn 1960)

Aura of a Nature Center

As everything in nature is inter-related, a nature center must be in harmony with itself and its surroundings. The Plover River, widened and deepened by a dam, slowly flows by an oak-pine grove which cradles the proposed Jordan Park Nature Center. The center's exterior, a quiet, aged and darkened red brick, harmonizes with the area's visual peace. In keeping with nature's aura or mood, the exterior has already designed the interior.

By looking out the window we can compose our color scheme: Plover River, blue-green; woodland, green; fields, yellow-green, yellow and brown. These colors are analogous (adjacent) colors on the color wheel (except for neutral brown). Such a color scheme, being analogous and having green as its main color, is considered natural (Commery and Stephenson, 1955).

An appropriate introductory color to the nature center's interior would be a shade of red. A red in a green color scheme (opposite or complementary colors on the color wheel) used in the entranceway prepares the visitor for a complementary color scheme (Halse, 1968).

After being directed through the entranceway by a large arrow on the baffle, the visitor would see several aquaria topped off with a red-brown cedar shingle roof (Illustration 15). Aquaria will provide visitors with the opportunity to observe thirty-five known species of Plover River fish. Where largemouth bass, northern pike and brook trout draw the visitor with their size, grace and beauty, the seldom-publicized darters, stonerollers, minnows, dace and sticklebacks will be equally intriguing with their color, detail and diversity (Becker, 1958).

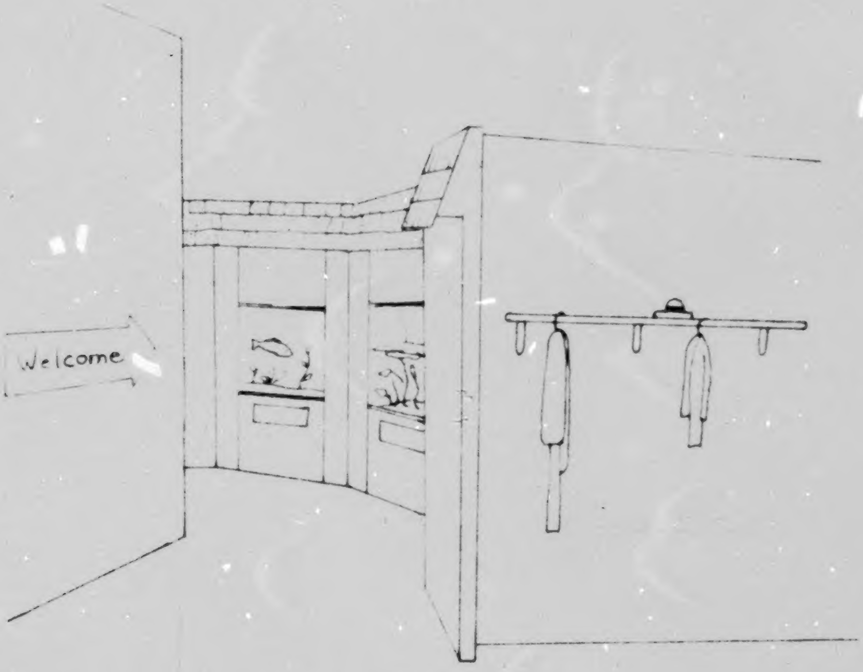


Illustration 15

By using light tints of the color scheme, the room will tend to appear wider than it really is. Conversely, a high intensity color would have visually shrunk the room (Barnes, 1968). The walls will appear to recede even further by using a cool color (blue-green) than by using a warm color (yellow or orange) (Commery and Stephenson, 1955). Thus, a blue-green tint would be ideal for this area by making the room appear larger than it really is, and also would be symbolically consistent with the aquatic and terrestrial displays.

As seen in Illustration 15, 3/4 inch thick panels above and below the aquaria would add a little variety to the wall. The panels would discourage monotony by breaking up an otherwise flat wall with a raised surface of gentle texture. To further enhance wall variation, the panels might be painted a very slightly brighter tint of blue-green.

To increase display flexibility, the panels could be detached from the wall and replaced with a continuous floor to ceiling panel covering up the aquaria. The new wall space could be utilized as needed.

As the visitor moves past the aquaria on the right, he or she will pass an audio-visual screen on the left (Illustration 16). Floor to ceiling rough-sawn cedar boards would provide an excellent non-reflective backdrop for the audio-visual screen. The red-brown cedar wall would fit in nicely with the cedar shingle roof on the opposite wall. The rough cedar will further enhance an interesting interior by contrasting its natural texture to the smooth, machined texture of the drywall (Neal, 1969). The interior cedar, the rusty entranceway, and the reddish brick exterior will harmonize beautifully within a red to brown color range unifying the exterior and interior.

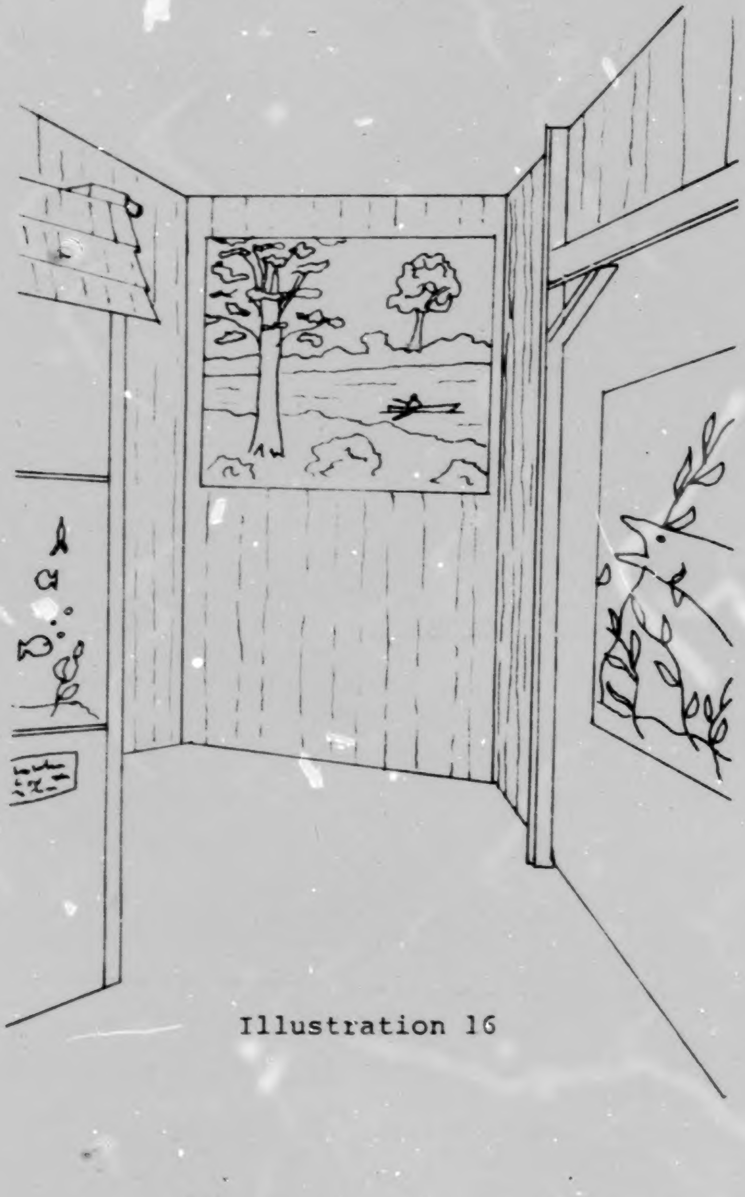


Illustration 16

Referring back to Illustration 16, the floor to ceiling cedar boards will end abruptly on the west wall and continue only above an eight foot high plaster wall. The division could be comfortably trimmed with a floor to ceiling, vertical 4 inch by 4 inch beam. The horizontal meeting of wood and plaster would be handled the same way with horizontal beams. Vertical beams at right angles to horizontal beams would disrupt a potential horizontal monotony (Neal, 1969). However, the horizontal beams need only be an inch thick by four inches high to act as false beams; flourescent lamps could then be hidden behind the board to light the lower wall. Horizontal beam supports at 45 degrees to each other would add to the rustic aura.

After the visitor completes his stay at the audio-visual screen and continues north, his or her view can be seen in Illustration 17. Aquaria will be to the immediate right, and several feet ahead on the left will be a "touch table" area. Since children are attracted to purer, brighter colors (Halse, 1968), the tables, labels and other accessories should be painted a color intensity (from yellow to blue-green) brighter than any other in the area. However, the color should not be so bright that it detracts from other exhibits.

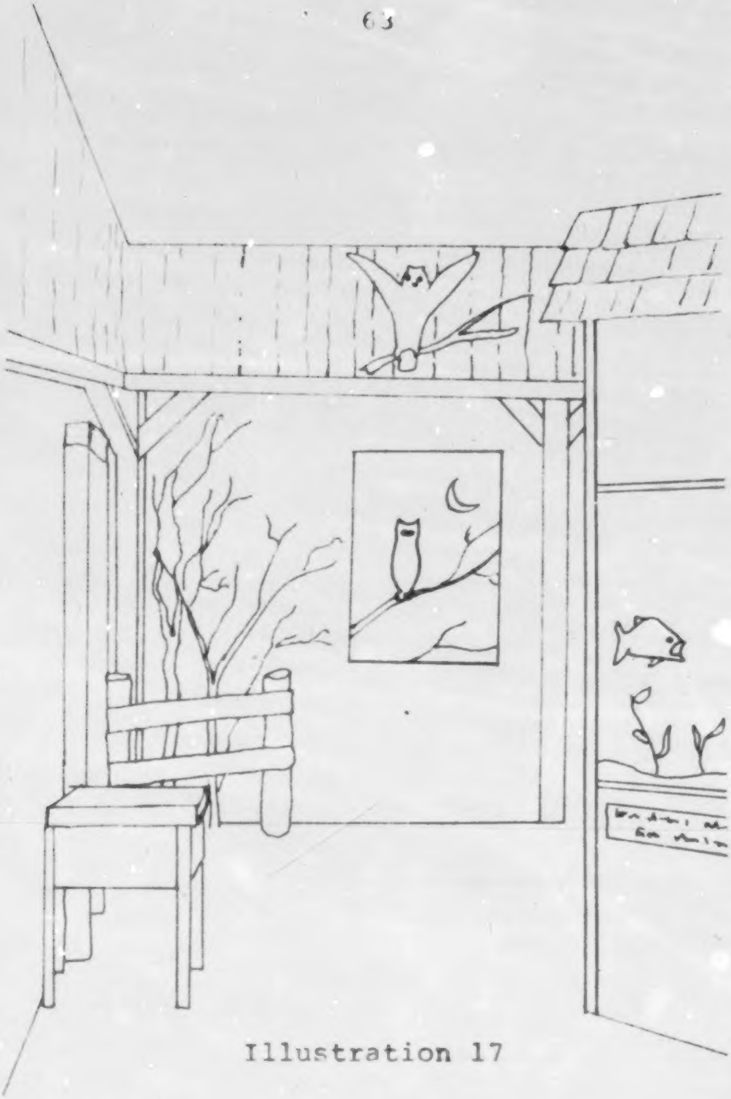


Illustration 17

As seen in Illustration 17, the rough-cut cedar and beams continue eight feet above the floor along the west and north walls. This continuous decorative panel of cedar could double as a display area. Mounted animals, sculptures, or whatever could be attached to the panel and spotlighted from above if necessary. The mounted objects might relate to an exhibit below or be purely decorative (NSYF, 1968). Also, any precious specimens or art objects placed ten feet above floor level could be spared from visitor handling.

The north wall below the cedar might be painted a light green tint to add a subtle but pleasing change from the light blue-green of the south half of the room. The north wall area as well as the plaster wall section in Illustration 16 would be offset nicely with a high contrast black and white photograph (Hartley, 1952). Another interesting possibility for these open wall spaces might be a display of children's artwork (NSYF, 1966).

As the visitor rounds the projecting acuaria on the right and continues north, he or she will see the bee hive to the right (Illustration 18). The hive display should be painted a light yellow (symbolic of the bee's honey). A warm yellow will brighten up the nature center without causing the room to drastically, visually shrink. According to the interior decorator's rule of thumb, three-fourths of the room should be painted warm or cool colors with the remaining fourth of the opposite colors (Commery and Stephenson, 1955). A yellow bee hive with a yellow-green back wall will also attract the eye.

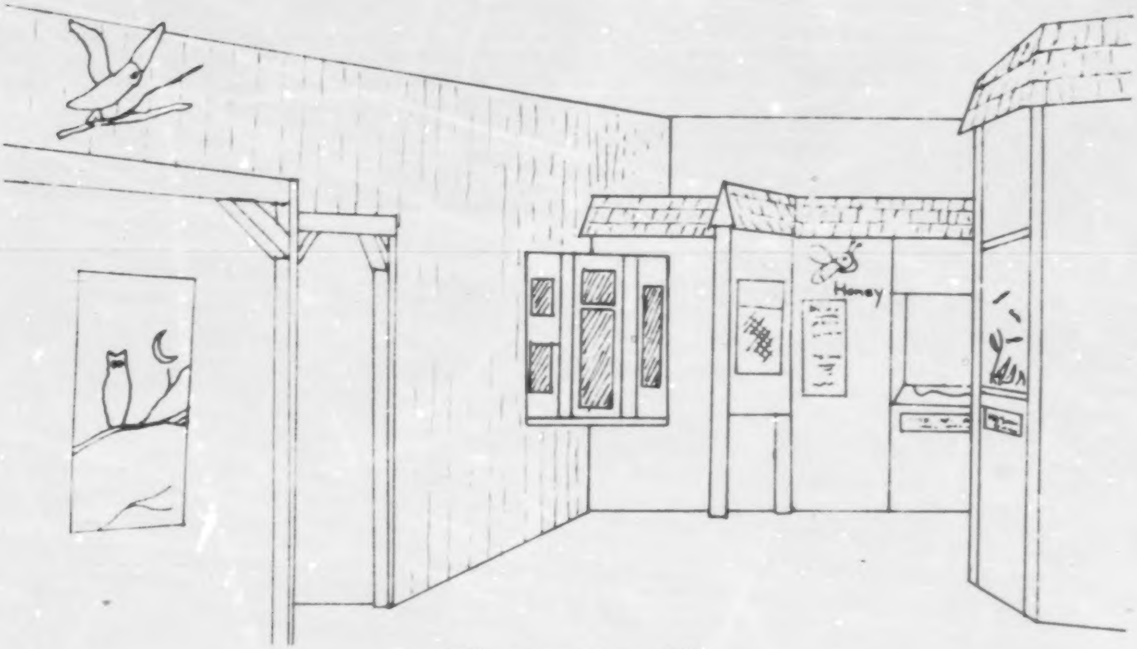


Illustration 18

In order not to detract from any of the subtle color changes throughout the room or the exhibits themselves, a neutral floor color would be most successful. A red-brown tint found in the cedar, entranceway, and brick exterior would harmonize technically as a neutral floor color and symbolically characterize the sandy soil of Jordan Park. The earthy colored tile would hide soil brought in by visitors thus minimizing floor maintenance.

Since the main exhibit area is approximately 24 by 36 feet and the ceiling is twelve feet high, the ceiling should be made to appear lower than it actually is (Hartley, 1952). A flat black paint would not only appreciably appear to lower the ceiling, it would hide any pipes, electrical spotlight tracks, or other hardware fastened to the ceiling. Visitors passing through the Milwaukee Public Museum barely take notice of their extensive use of high black ceilings, as they see only the well lit exhibits below.

Because the exhibit area has been shut off from natural light, the exhibits may be selectively lit to achieve a desired effect. Only with a very controlled artificial lighting system will the black ceiling effect be a success (NSYF, 1968). The displays will vary in light intensity, type of lighting (flourescent or incandescent), and position of lighting (overhead, side, or backlighting). Such strategic lighting would fail if natural light was permitted to indiscriminately scatter in all directions.

Final light selection in certain areas may vary upon the nature of each exhibit. Flourescent lights vary from cool blue to warm pink (Halse, 1968). Deluxe flourescent lights help beautify colors when compared to standard lights (Commery and Stephenson, 1955). Some displays may be better suited to the dramatic lighting of an overhead spotlight beaming from the black ceiling.

Just as the correct colors, textures, and lighting contribute to the rustic aura of Jordan Park Nature Center, the display labels must fit into their niche. A label functions by informing the visitor only after it has attracted the visitor. Labels written like newspaper headlines, subheadlines and stories catch the visitor's eye by simply stating the exhibit concept in a headline (Neal, 1969). The concept may be further broken down into subheadings with a smaller letter case and a still smaller case for the story. To avoid confusion, no more than two letter styles should be used throughout the exhibit area.

A label title may be made more attractive if it is painted with the accent (red) of the color scheme (green). The soft red-brown found in the cedar paneling would be a most appropriate color. The accent color should be evenly dispersed throughout the entire exhibit area and not be clustered in one corner or exhibit (Barnes, 1968).

Moving out of the main exhibit area, the visitor enters the forest alcove (Illustrations 19 and 20). The alcove is unique because it is not confined by the physical building boundaries. The curved ceiling becomes the sky. The tile floor gives way to a raised wooden footbridge converting scuffing footsteps to clumping footsteps on wooden planks. The floor supporting the bridge becomes a soft wetland or perhaps a rocky crest with corresponding plants (alive or artificial). The building opens its walls to the west with multi-paned, early-American windows creating a panoramic view of the surrounding woodlot. The wall to the east features a woodlot with actual and painted arching tree branches overhead, silouetted against the sky. Taped recordings of birds, insects and amphibians are heard along with live bird songs amplified from the bird-feeder just outside the window. The alcove has been transformed from a narrow, dismal corridor into a life-size exploratory diorama in which the visitor is encouraged to learn through his or her many senses (NSYF, 1968).

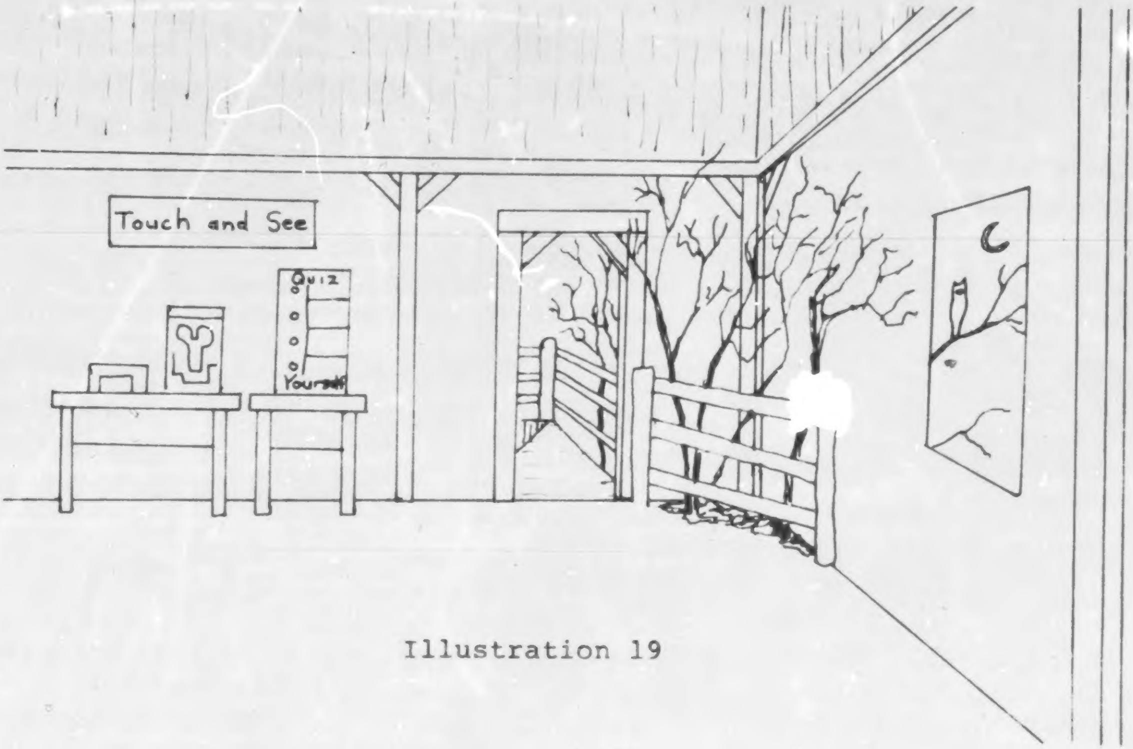


Illustration 19

Returning to Illustration 19, the alcove could be introduced in the main exhibit area by a variety of local saplings situated in the northwest corner. Similar saplings would be placed within the northern end of the alcove. A rustic fence beginning in the main exhibit area would proceed up the alcove ramp and continue alongside the footbridge.

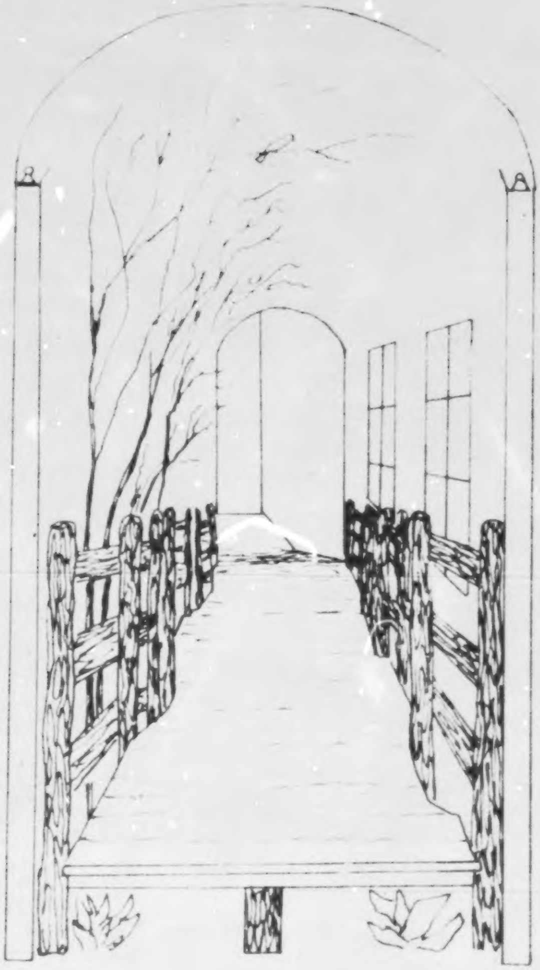


Illustration 20

As seen in Illustration 20 (the entrance ramp was excluded for viewing purposes), the bridge would zig-zag back and forth allowing for placement of window displays and east wall trees. By placing displays at angles to the visitor's line of vision, the displays will be more easily seen than if they were flat against the wall and parallel to the visitor's path (Neal, 1969). Neal adds that a variation in floor and ceiling height such as the raised footbridge and curved, lowered ceiling eliminate visitor fatigue through visual variety.

The forest aura should vary with seasonal changes (NSYF, 1966): green and autumn acetate leaves (similar to those made by the Milwaukee Public Museum with their vacuum form mold) could be attached to arching branches in summer and fall. Winter and spring could feature leafless branches. The recorded bird, amphibian and insect calls could change from winter to summer. In addition, flora and fauna beneath the bridge could change seasonally. The artificial ceiling lights should be adjusted to the incoming window light (Neal, 1969). Natural light varies from day to night, from morning to afternoon, from cloudy to sunny days, and from bright winter snow to summer greens and autumn browns. The types of flourescent bulb (cool, warm, deluxe or daylight), their position, and their number may be most accurately decided after the windows, bridge, and trees are intact (as long as the basic wiring is installed).

A cool, light blue-green, characteristic of a deep woods, would fit the alcove's west wall very nicely. The alcove's south wall might be painted a deep blue-green to further integrate the forest aura. A deep color would also discourage visitors entering the nature center from moving against the traffic flow by entering the alcove's south exit.

Display Concepts

Displays are the focal point of any nature center. For this reason, they should be as effective as possible. Before we can put together effective displays we have to understand how people will perceive what we present (Kaplan, 1973) and thus, how we can best assist this process.

Man is a selective information processor. He selects information based on his own background, and based on the strength of the sensations present.

Man also has a natural bent toward physical involvement with what he sees--he needs to have an effect on, change, and manipulate the world. This idea is the basis for White's principle of effectance (White, 1959). The need for effectance is the reason we will offer displays like the quizboard and the touch table.

Another way to increase interest and heighten perception is to provide stimuli for as many of the visitor's senses as possible. Involve him in sight, smell, touch, taste, and hearing (Whitmore, 1968) situations.

In our enthusiasm to "turn on" the people who view our displays, however, we must take care that we don't overwhelm and confuse them by throwing out more information and stimulation than they can comfortably handle. Variety is fine but it must be tempered by predictability. Considering the end result of the display experience, we hope to achieve a unity and sense of order that will put the visitor at ease, that he may learn and enjoy nature.

We have endeavored to build a high degree of flexibility into the displays, so that many of them can be periodically freshened, updated, or even changed completely. We attempted to pick displays that were adaptable to school programs and also were of interest to the general public.

A study done at the University of Wisconsin-Madison compiled and rated over one hundred environmental education concepts (Roth, 1970). They found that one concept stands out in importance among all the rest. That concept is, "Living things are interdependent with one another and their environment." We strongly recommend that this be emphasized in the displays of the Jordan Park Nature Center.

The displays presented herein are listed sequentially as you would see them by following the wall, and moving around the room counterclockwise. They each have a letter designation matching the letters on the floor plan of the display room (Illustration 21). The order in which we discuss them is not an inference of expected flow pattern; that subject is handled in the interior design section.

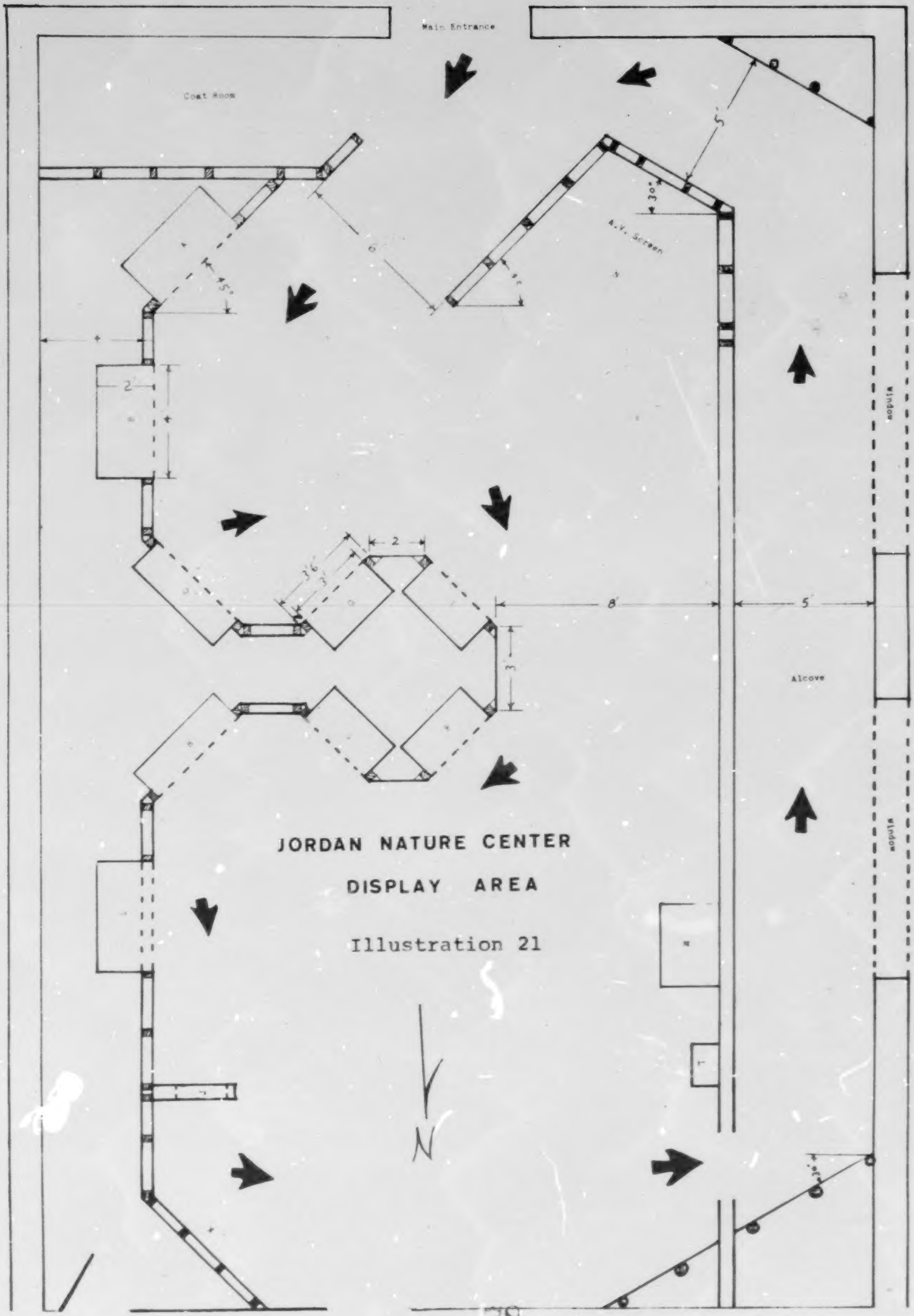
(A)
Terrestrial Plant Display

This would be a display of native plant life (best suited to the smaller, ground-cover type species). It should emphasize both the identification and the importance of these plants. Many of them are valuable food species for wildlife.

This display will be the first one on the right as you enter the display area. It will have the same dimensions as the other modular display units (48" x 30" x 18") along this wall--exceptions will be noted as they occur. The unit will have two sides, a back, and a bottom. The front will be a hinged glass door. The two sides and back could be constructed of hardboard or cellotex (depending on texture desired) and painted as desired. The bottom would be a sheet metal tray, water-tight and measuring 48" x 18" x 6" deep. It would contain the soil for the living plants. Entire materials cost for this unit would be under fifty dollars.

Several plants will be rooted in the six inches of soil on the bottom of the unit. Photographs, on the background, will depict the same species with attention focused on those distinguishing features which aid in identification. The simplest way of focusing attention is by drawing arrows on the photos, pointing out leaf margins, fruit, leaf shape or whatever features will help to identify it. Another way (especially good for minute, hard-to-see detail) is to superimpose over the picture the likeness of a magnifying glass. The area of the plant shown through the lens could be either a drawing of the detail shown enlarged or another photograph (this one a close-up, cut round to fit within the frame of the magnifying glass). A brief, interpretive explanation would be off to one side.

The plants chosen for exhibit in this display could be changed periodically. This would have the following advantages: 1) certain plants and wildflowers become prominent at different times of the year, and are best displayed then, 2) certain plants will grow well indoors for only short periods of time, and 3) the display should be changed periodically simply to renew it and keep it from becoming boring. Visitors to the nature center will be repeat visitors only if they feel there will be something new to see.



Main Entrance
Coat Room
5'
30°
6'
45°
A.V. Screen
4
2'
4
2
3'6"
3'
8'
5'
3'
window
Alcove
window
N

JORDAN NATURE CENTER

DISPLAY AREA

Illustration 21

This display could lend itself to alerting school children, as well as many adults, to the presence of poison ivy when they come upon it in the wild--indeed right along the nature trails at Jordan Park.

If the nature center were operating at the present time, this display could take advantage of a current fad. There could be a display of local edible plant species. The first purpose of this display would have to be a caution to any aspiring young "Euell Gibbons types" not to eat anything that hasn't been identified as edible with absolute certainty. This is only one example. Any of the following displays can be made more appealing by keeping up with popular trends.

(B)
Aquatic Plant Aquarium

The aquatic plant display would be situated in an aquarium located between the terrestrial plant display, and the fish aquaria. This allows for a more logical sequence from one display to the next.

The emphasis in this display should be on those aquatic plants which occur locally. An attempt should be made to show the visitor the entire plant, not just the portion he can see floating on the surface of a pond. On adjacent walls the visitor would see either interpretive or pictorial messages to make him aware of the role of aquatic plants in their ecosystem. The visitor should also be made aware of the effects of man and his activities on these plants.

With so many possibilities for this display, the naturalist would have to resist the temptation to try to show everything. The result would be a cluttered display that would confuse and overwhelm the viewer. Better to put together a display of only a few important aquatic plants and relationships--leaving the rest for another display, at another time.

The aquarium used for this display will be of the standard size used throughout the visitor center. Size, construction and costs of these custom-made aquaria will be covered in the following discussion on the fish displays.

This display must be lower than most of the other displays so that even the younger visitors will be able to see the floating tops of the various aquatic plants. The bottom of the display should be approximately two feet from the floor, allowing the children as well as the adults to see the entire display (Illustration 22). Plants would be anchored in the six inches or so of sand and gravel on the bottom of the aquarium. The viewer would see them as they emerge from this bottom material, follow their stem upward, and be able to look down on their floating leaves (possibly the leaves and blossom of a water lily). Extending upward and outward from

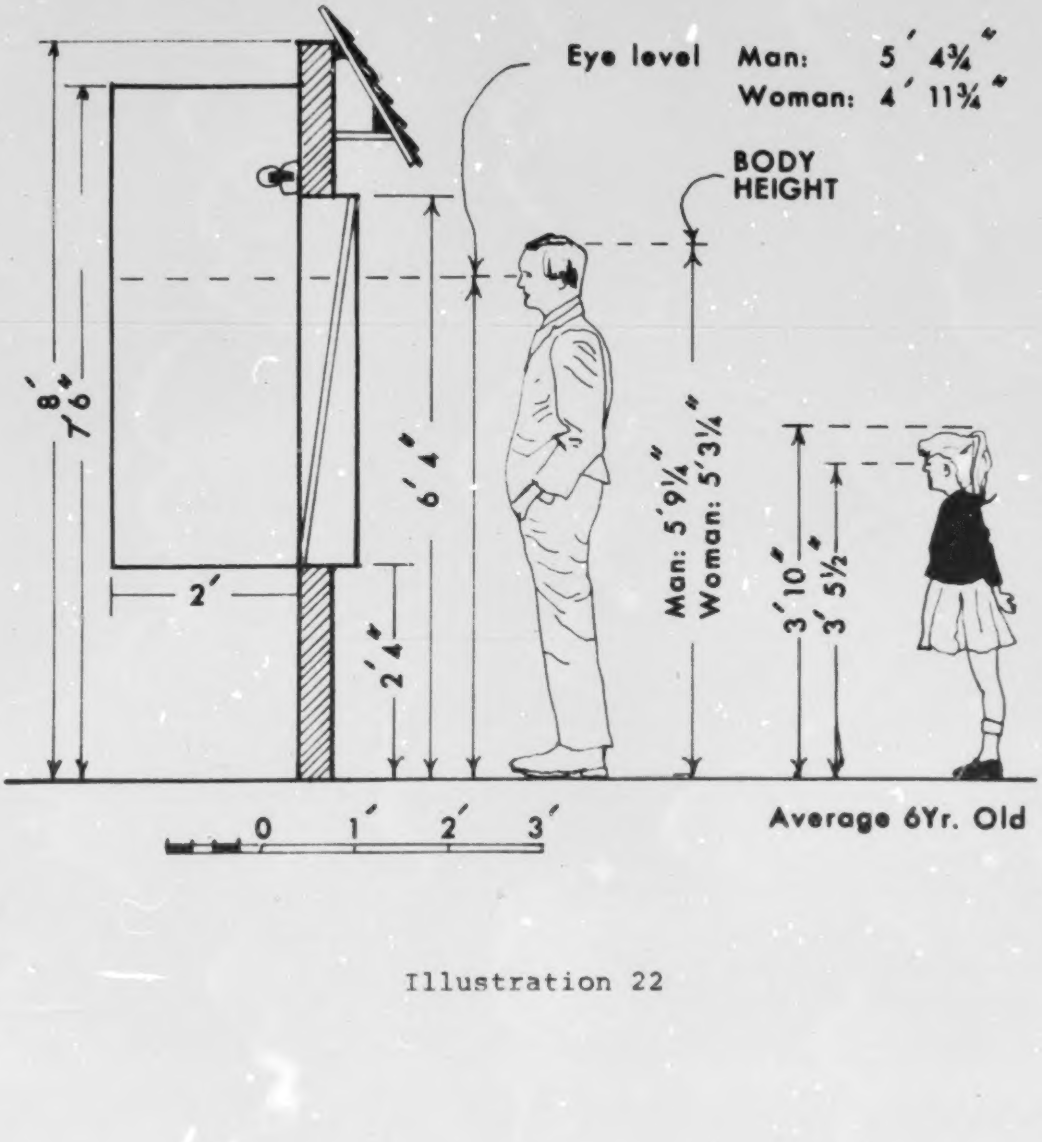

Eye level Man: 5' 4¾"
Woman: 4' 11¾"
BODY HEIGHT
8'
7'6"
6'4"
2'
2'4"
Man: 5'9¼"
Woman: 5'3¼"
3'10"
3'5½"
0
1'
2'
3'
Average 6Yr. Old

Illustration 22

the back of the aquarium would be a flat panel with whatever written explanation of the display is necessary. Since the top of this aquarium will be exposed, it will be covered with a piece of plexiglass. In as much as this display requires a departure from wall designs set forth in the chapter on interior design, please refer to Illustration 23 for these details.

Although there is very little limitation on the types and species of aquatic plants used, there are four common ones which would lend themselves well to display in this manner: duckweed, pondweed, arrow arum and the yellow water lily. It would also be good to sprinkle in a few water striders on the surface of the water occasionally, just for a touch of realism.

To demonstrate a specific example of the inherent versatility of this display, let us consider its approach. If the local schools were studying water pollution, the nature center could reinforce this study. The display could be a dramatic demonstration of aquatic thermal pollution. To do this, divide the aquarium into two halves, right and left. One side would represent a normal body of water, the other a heat-polluted body of water. Table 5 presents the content for this suggested display.

Table 5 - The normal water would be depicted as follows:

1. The left aquarium half would contain normal, healthy aquatic plants.

2. Submerged in the water, a thermometer, adjusted to read 65° F.

3. Photograph or artist's rendering forming the background, depicting a scenic stretch of river in a natural setting.

4. Explanation on the panel to involve: high dissolved oxygen content of the water and normal species distribution.

The thermally polluted water would be depicted in this way:

1. The right aquarium half would contain a proliferation of aquatic plants, especially blue-green algae.

2. Submerged in the water, a thermometer, adjusted to read 75° F.

3. Background depicting a river flowing through a polluting industrial complex.

4. Explanation on the panel should involve: low dissolved oxygen content of water, and perhaps photos of dead fish washed up on shore.

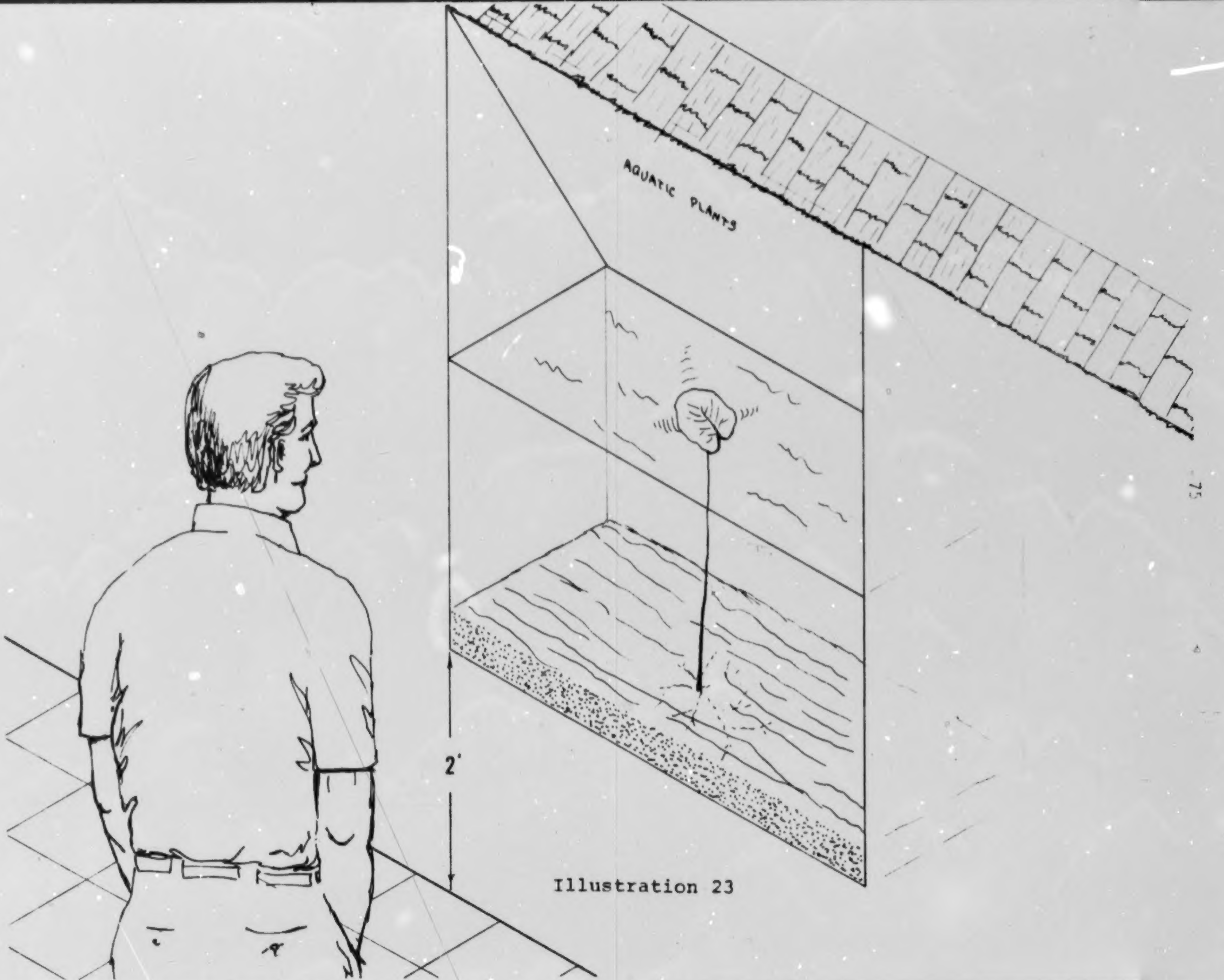

AQUATIC PLANTS
2'

Illustration 23

(C-H)
Aquaria

Large aquaria (3 feet long, 30 inches high and 18 inches wide) may be custom-made and purchased through the All-Glass Aquarium Company near Milwaukee, Wisconsin. Drains can be built into the aquaria; mirror backgrounds can be included to add depth. Such an aquarium with 5/8 inch glass bottom and 1/2 inch side glass would cost $120. Terraria for land animals and land plants (4 feet long, 3 feet high and 18 inches wide) cost $125 due to thinner glass.

The catwalk service corrider to the east side of the display room will allow the naturalist to maintain the aquaria and other displays without disturbing visitor flow.

(J)
Observation Bee Hive

Not only is an observation beehive an interesting and educational display, but the fact that it is a living display will intrigue young and old alike. The visitor stopping at this display will be able to see the bees, hear their buzzing, and smell the honey.

The beehive shown in Illustration 24 (Gojmerac, 1973) can be constructed in any workshop and safely encloses the bees within wood and plexiglass. There are screen-covered vents and a pipe passage way to the outside of the building.

The appeal of this particular design is that it accepts the standard 6¼ inch shallow frame, which can be purchased from any bee supply house. Well-seasoned wood is recommended to insure close fits, freedom from warping, and thus, identical and interchangable frame holders. The height of the unit is adjustable to suit the varying size of visitors. The entire display, exclusive of labor, should cost no more than 100 dollars. A full colony of bees, brood, queen, and honey (to get established) costs less than forty dollars (Rice, 1974).

It is very important that the outside opening not interfere with people walking outside near the building. For this reason, we recommend that the outlet be well above head level. After emerging from the hive the bees will rise and disperse quickly to distant sources of nectar. We mention this to allay any fears of bees swarming around the nature center and being a nuisance.

The beehive can be installed in the spring as soon as the daytime temperatures go above 60° F. It is best to wait, however, until the fruit trees and dandelions begin to bloom.

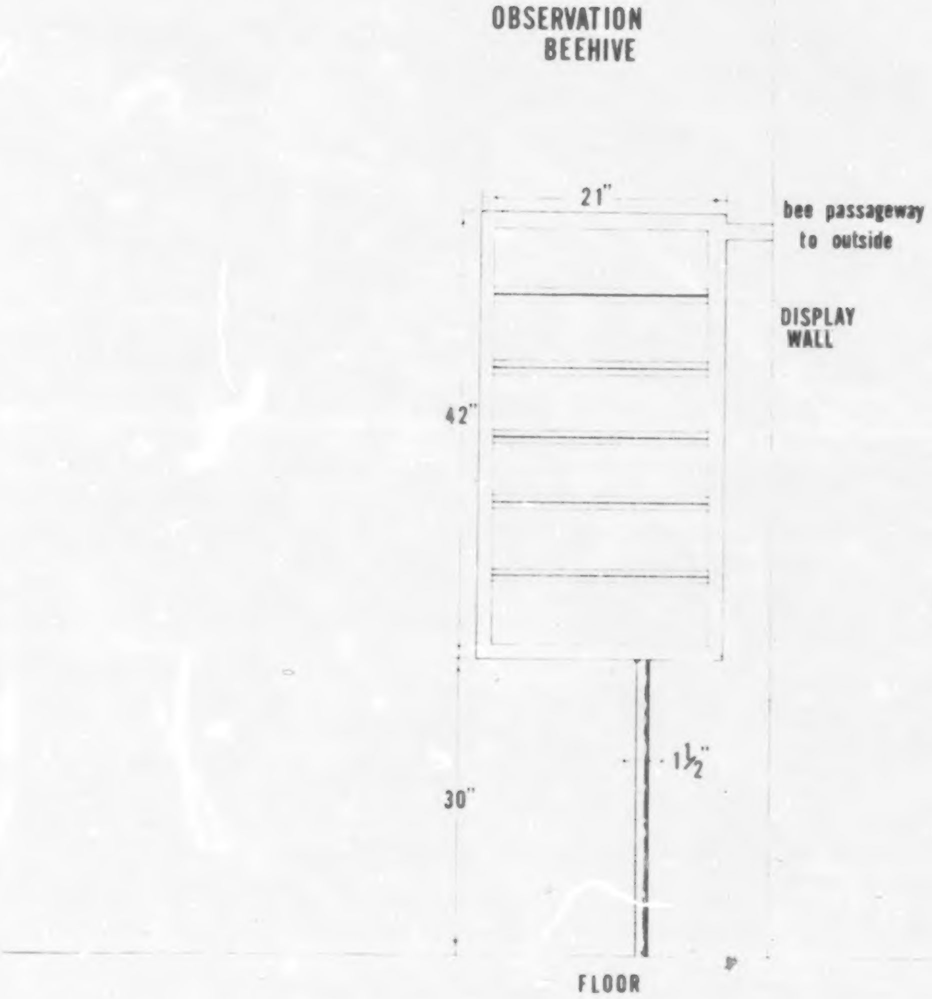

OBSERVATION
BEEHIVE
21"
bee passageway
to outside
DISPLAY
WALL
42"
1½"
30"
FLOOR

Illustration 24

The best way to get the beehive started is to purchase an existing colony from a local beekeeper. Three frames of brood and honey make a good start--one frame with substantial amounts of sealed brood, and one frame containing honey. The third frame should be sufficient to tend the brood and the queen. Make sure that the queen is laying and conspicuously marked, enabling the visitors to recognize her.

The university extension service fact sheet cited in the bibliography is the primary source of these recommendations, and we highly recommend that it be read thoroughly before work is begun on this display. It necessarily covers, in more detail than possible here, the construction of the display, initiating the colony, maintenance of the colony, and apiary inspection laws in Wisconsin.

Many of the facts explained here (such as air vents, passageway to the outside, nectar sources, and range of the bees) will be of interest to the visitors and should be interpreted on a sign near the hive. Other concepts that could be stressed are: 1) the social order of the bees (draw parallels to man); 2) the interrelationship of bees with their environment (honey making and pollination); and 3) explain the difference between this observation hive and hives as they occur in the wild.

The fact sheet alluded to previously offers some entertaining experiments and raises some interesting questions that can be readily answered by observation of the bees, for instance:

1) At what temperature do bees begin outdoor flight?

2) How early in the morning and late in the evening do they fly?

3) Can you tell which flowers are blooming by the color of the pollen on the bees or by the honey?

For further study on the activity of bees, especially on their ability to communicate in dances, there is an excellent source listed in this bibliography (Frisch, 1967). Among other things, the author points out that bees, through their dances, are able to communicate to the rest of the colony the distance and direction of rich sources of nectar they have located.

This is certain to be a thought- and question-provoking display, and the naturalist staffed in this facility would be wise to become attuned to these questions so that he can develop the display to its fullest extent.

(L)
Quizboard

This display will provide yet another tool to involve the visitor in the nature center experience. Its location will be such that the visitor will encounter it after having viewed the other displays. It will offer questions (multiple choice) that can be answered on the basis of the information they have just been given in the displays.

Aside from involvement, this display has another purpose--that purpose is teaching. The viewer will learn the correct answer even if he chooses a wrong answer at first.

The quizboard will utilize electric circuits and a light located behind the front panel. The questions and answer choices will be printed on the front of this panel. Four buttons, one for each of the four answer alternatives, will appear under the question. The wiring behind is arranged such that only one button will complete the circuit and cause the green light to light up. It will illuminate a small piece of frosted glass set into the front panel. A correct response reinforces the visitor as he sees the green light and takes pride in his correct answer. It is a rather novel way of taking a test and children, even adults, should have fun with it. See Illustration 25.

A simple quizboard such as this should probably not have more than six or seven questions. More than this would cause a back up of people at this point, as they waited to test their skill.

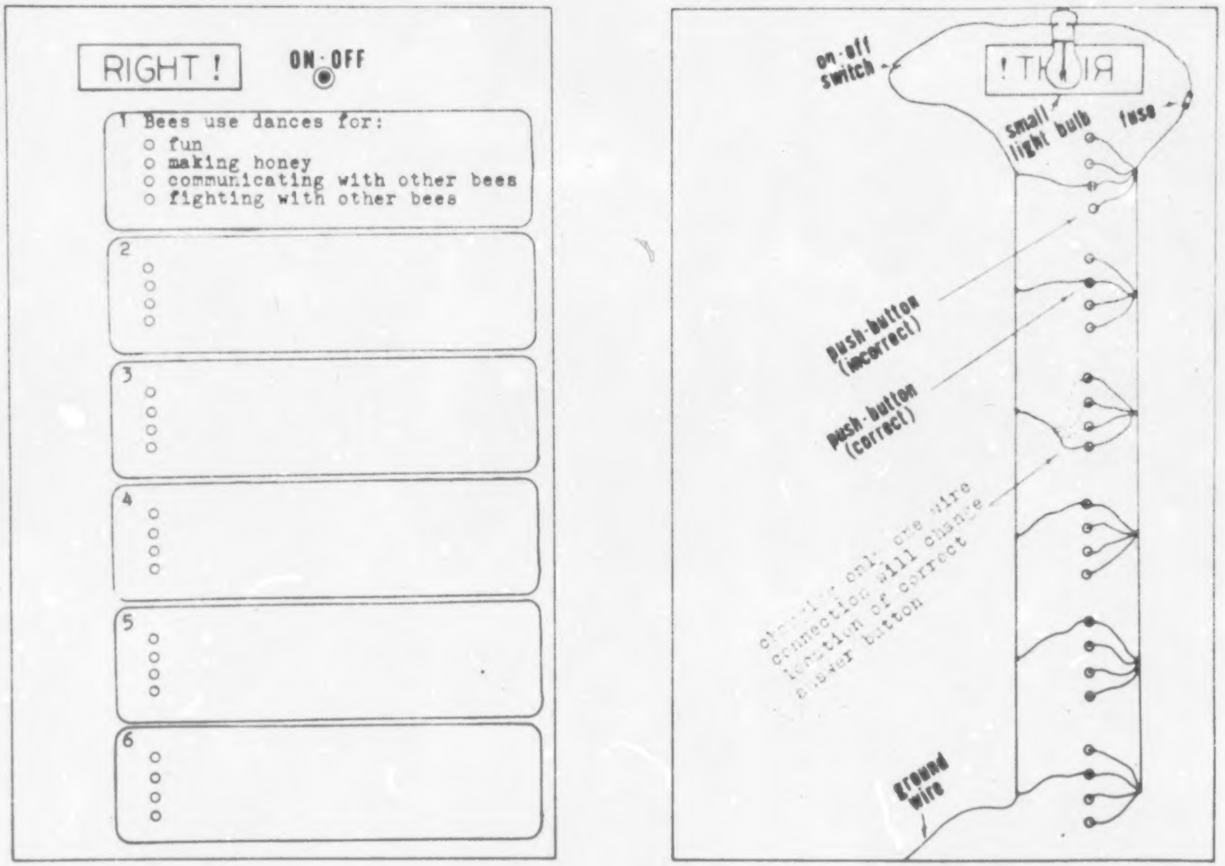
This simple electrical quizboard could be made for less than seventy-five dollars.

There is a more sophisticated quizboard--a recording quizboard (Wagar, 1972). The recording of responses to questions is a very useful feature. Counters inside keep track of how many right answers occurred (and also how many wrong ones) for each question. The value of this feature, obviously, is that the naturalist can determine the effectivenesss of his display. The reference cited gives detailed instructions on constructing this quizboard, including a wiring diagram. Cost for materials is listed at $215.

(M)
Touch Table

The touch table display will actually involve the visitor in the handling and manipulation of objects. As stated before, the involvement of several senses (touch, smell, sight, sound

QUIZBOARD PANEL


RIGHT !
ON-OFF
1 Bees use dances for:
○ fun
○ making honey
○ communicating with other bees
○ fighting with other bees
2 ○ ○ ○ ○
3 ○ ○ ○ ○
4 ○ ○ ○ ○
5 ○ ○ ○ ○
6 ○ ○ ○ ○
on-off switch
small light bulb
fuse
push-button (incorrect)
push-button (correct)
changing only one wire connection will change location of correct answer button
ground wire

FRONT

REAR

Illustration 25

etc.) makes a nature center visit more interesting and helps the visitor learn more. Hopefully, this display will exercise all of the senses and thus provide a novel, interesting experience.

The main item in the display will be a table. The size recommended is 4' x 4' and 30 inches high (this is a very flexible recommendation, though). We would not recommend a table higher than 30 inches, considering the size of many of the school-aged visitors.

Potential display items are many. They can be changed frequently to fit a variety of themes. Following are some parameters to consider when selecting items for display on the touch table.

1) Safety--nothing sharp, or otherwise dangerous to tiny hands.

2) Value--items should be of low value to insure against theft.

3) Durability--if not durable, items should be plentiful enough to replace often.

Following are some suggestions for display items. There are many, many more:

> Deer antlers, snake and animal skins, interesting rocks, bark and pine cones of various trees, fish scales, and (to involve the sense of smell) small viles of liquids with many of the odors of wild plants (wintergreen, wild rose, wild strawberry, blueberry etc.).

The table itself represents the only cost here--less than ten dollars.

Forest Alcove

The forest alcove will create an outdoor experience, indoors. The result would be a controlled natural situation that will facilitate teaching certain natural principles (notably ecological succession). The visitor, while "soaking up" the aura of the alcove will have a view out the two large windows. His attention will be focused on specific trees or other members of the natural community outside. Immediately under the windows, there should be photographs of the view from the corresponding window. These photographs will provide the working surface for interpretive messages to the visitor. The central message to the visitor will be that the woodlot seen from the windows is at a particular stage in succession, and ever changing with time.

On the photograph, an arrow would point out a specific tree. At the base of this arrow then, a written message (at some later time perhaps a button which would activate a recorded message) explains that this tree is a young red maple.. This species, tolerant to shade, will prosper even though it seems dwarfed by the larger oaks around it. Since it is shade tolerant, its seedlings will flourish and those of the neighboring oaks will die. Eventually then, the maple and other tolerant species will be the dominant members of the forest community. They will have replaced the various pioneer species.

This is but one example of a point which could be interpreted to the visitor in the forest alcove; there are several others: 1)ecotone or edge-effect; 2)setbacks in succession such as fire, logging, etc.; and 3)the fact that this part of Wisconsin is a tension zone--to the south the climax forest is mainly beech and maple, to the north, pine and hemlock.

The photographs used in the alcove should be taken with an 85mm lens, as this is the size which offers the closest approximation of the human eye in terms of perspective. The photos should be taken from the exact spot where the visitor will stand to view the scene out the window. The pictures displayed beneath the windows should be 11" x 14" enlargements. Black and white photographs are much cheaper; color prints would add realism. Photographs should be sprayed with a matte finish fixative so that the necessary marks and arrows can be drawn in with black ink. After this, the photos should be mounted in place under non-glare glass or plexiglass. Angled out about forty-five degrees from the window, they will be convenient to read when glancing downward, and receive ample illumination through the window.

Photographs will need to be up-dated from season to season and year to year due to growth of vegetation and its changing seasonal character. The old photos should be saved and cataloged (or even displayed) as this will, in effect, be a pictorial account of succession.

Another display feature that could be incorporated in the alcove would be study of native songbirds. A bird feeder or two outside in the yard would attract birds and condition them to use this facility. The view out the window from the alcove would provide the visitor a chance to see the songbirds outside. The change of species using the area in the different seasons would offer some built-in variety in the display.

Adjacent to the bird viewing window could be a rotary flip display of bird photographs and identification (discussed in further detail in the audio-visual section) with which the viewer could identify the songbirds he didn't recognize. An inexpensive, ten power telescope could be mounted in the window and aimed permanently at the bird feeder to provide a close-up view of the birds.

The display section of the forest alcove will cost less than one hundred dollars. This price includes telescope, three color enlargements with non-glare glass, and bird feeder.

Related Areas

There are some other areas that are absolutely essential to the building of displays. Unfortunately space does not permit us to take a close look at them. For this reason, we are listing those areas below, along with references for each area.

Proper wording of titles--(Nelson, 1968)

Lettering on Displays--(Rombold, 1970), (Neal, 1969)

Paints for Displays--(Neal, 1969)

Display construction materials--(Neal, 1969)

Tools needed in the display workshop--(Neal, 1969)

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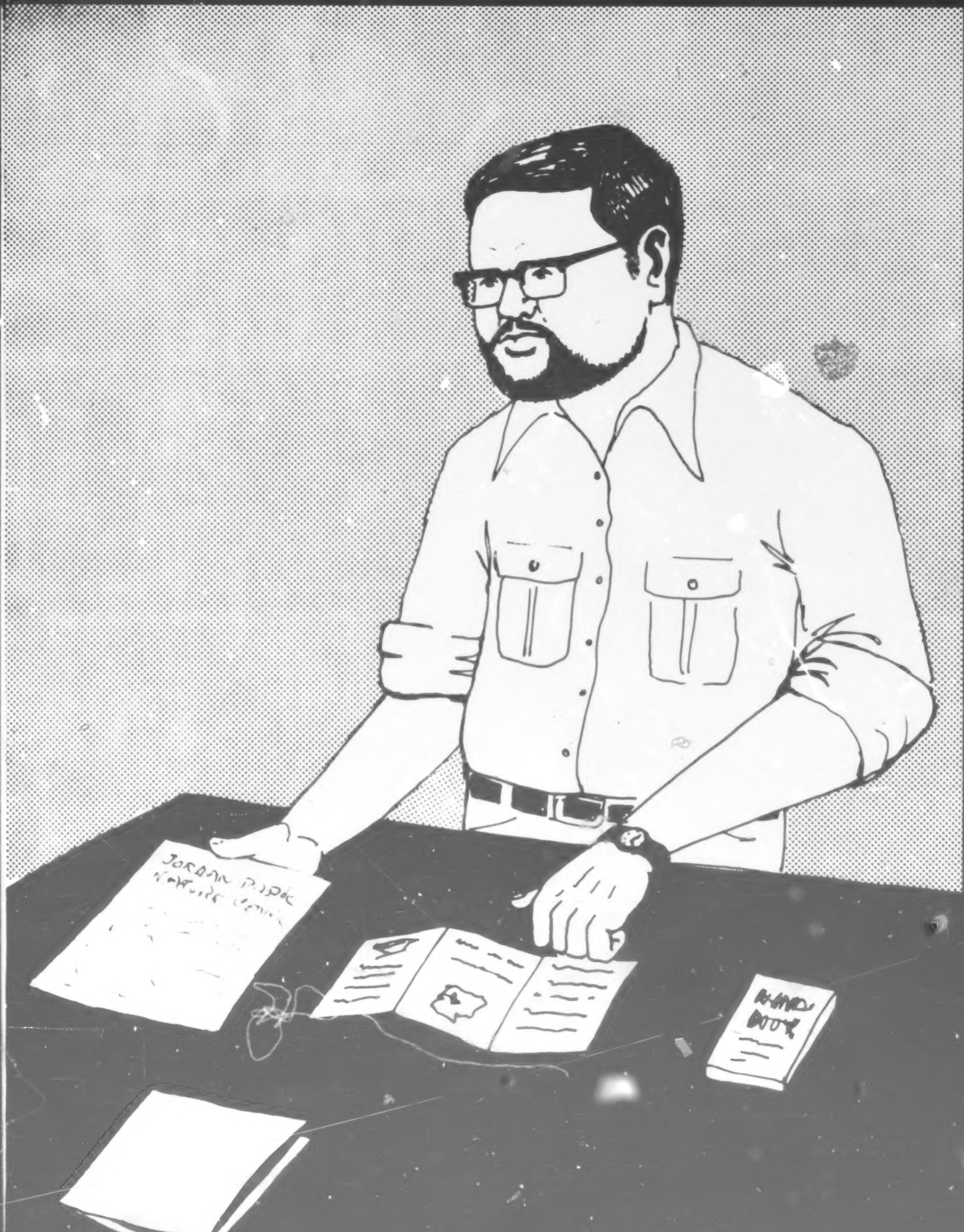
AUDIO VISUALS
AND
PUBLICATIONS

George R. Fricke

Anthony M. Pudlo



JORDAN PARK
Nature Center
HAND BOOK

Freeman Tilden (1967) defines interpretation as "an educational activity which aims to reveal meanings and relationships through the use of original objects, by firsthand experience, and by illustrative media, rather than simply to communicate factual information."

Interpretation includes naturalist talks, exhibits, audio-visual programs, labeled nature trails, brochures, publications, and other facilities and services, which are provided to help people enjoy and understand the natural and cultural resources of the areas they visit (Field and Wagar, 1973).

Such things as audio stations, slide shows, films, slide-tape presentations, collections of specimens and objects, signs, labels, and publications, even displays and exhibits, can come under the "audio-visual" heading in interpretation.

All of the above activities can be implemented into the overall interpretive program at the Jordan Park Nature Center. Since displays and exhibits are being handled as a separate part of this plan, we will concentrate on the audio-visual and publications aspects of the interpretive program.

The Need for Variety

As we formulated our overall plan for the center, we decided to introduce as much variety as possible into all aspects of the interpretive program. An overall planning goal, then, centers around peoples' need for variety and ways in which we could introduce such variety into our program.

Communication is designed to create understanding (Gilbert, 1964). We want to communicate an understanding of nature at the center. To do this, a variety of interpretive methods should be used because not all people will respond to all communications media. In order to communicate to a larger percentage of visitors, several forms of communication are required (Mahaffey, 1969).

Communication involves learning, and people learn by using more than one sense, that is, by using a variety of senses. Psychologists and sociologists agree that learning and understanding are increased in proportion to the number of senses employed in a communications effort. The process of learning, as determined by psychologists, is generally about 83% dependent upon sight, 11% upon sound, and 6% upon smell, touch, and taste (Gilbert, 1964). Taking this information into consideration, much of our program will involve sight, but the other senses will not be ignored.

One of our goals involves the constant updating of the center and its program. We want to change things from season to season and from year to year. New visitors, as well as repeat visitors, will be coming to the center each year. Constant change encourages visitors to return again and again, showing that the center is not static. A changing interpretive program will reflect the constantly changing outdoors (Edwards, 1971).

There are many ways to update an interpretive program. One way is through audio-visuals, for it is easier and cheaper to change an AV program and a series of inexpensive, mass produced publications than it is to change exhibits.

Reasons for Having an AV Program at the Center

According to people who have been involved in interpretation and in the use of audio-visual devices (Erskine, 1964), interpretive efforts are strengthened through the use of audio-visual tools. Audio-visual materials increase and sustain attention and concentration; provide concreteness and realism in stimulus situations calculated to instigate learning; increase the meaningfulness of abstract concepts to students; bring remote events into the classroom; stimulate interest; increase motivation; introduce variety of stimulation and generally increase personal involvement of students in learning (Mahaffey, 1969).

Gilbert (1964), an authority in the area of natural resources, communications and public relations, adds that visual aids increase retention because more than one sense is employed.

Research has indicated that viewers enjoy and accept the opportunity of learning by more than one medium and actually prefer combinations of media or varieties to a single medium (Mahaffey, 1969). According to Mahaffey and Hanna (1971), we need to find the best way to communicate a message which will entertain and hold the viewer's attention at the same time. Audio-visual devices, if properly used, can enhance learning and can communicate and entertain at the same time.

The Place of AV Devices in Interpretive Programs

We must consider the proper place and role of audio-visual devices in an interpretive program. Many interpreters have expressed their thoughts in regard to this.

Men like Tilden (1967) realize that, other things being equal, no device is as desirable as interpretation by direct contact with the person. According to Tilden, there will never be a device of tele-communication as satisfactory as the direct contact with the voice, hand, eye, and with the casual and meaningful adlib. Also, no machine can duplicate that "something" which flows out of the very constitution of the individual's physical self.

According to Edwards (1971), much of the secret of park interpretation is due to the abundance of personal communication between the naturalist and the public. A machine cannot please, inspire, or inform with the effectiveness of an enthusiastic human being. Field and Wagar (1973) believe that informal contacts with interpreters, in many cases, are the most rewarding for a visitor, and that this should be the rule to the greatest extent possible. A mechanical presentation does not give the proper acknowledgement to the human factor that is so necessary in supporting a good relationship with the visiting public (AMISOL, 1965).

We must be careful about gimmickry, then, for such devices can easily become ends in themselves, both to the staff and to the audience (Edwards, 1971). Such devices must not be allowed to become crutches (AMISOL, 1965) An interpretive facility could be designed to deal impersonally with individuals, so that instead of ready access to a real live naturalist, a visitor would meet only AV programs and message repeaters (Field and Wagar, 1973). We must guard against such ends and must use our AV devices properly.

Even though audio-visual devices do have shortcomings, we must realize, as does Tilden, that gadgets have come to stay, and they will be used to a much greater extent than they are now. We will be relying heavily on AV technology for communicating ideas to the public (Mahaffey and Hanna, 1971).

An automatic audio-visual device may occasionally do a job better than a live interpreter. A carefully planned and well produced presentation will have the same quality the tenth or the fiftieth time as it had the first time it was presented, granted that someone has given it a small amount of regular preventive maintenance. An electronic device can do things that could only rarely be done by a live interpreter, such as demonstrating bird songs and calls (Erskine, 1964). An institution should not install any mechanical devices until it knows that such gadgets can be adequately, continually, and quickly serviced. The history of park interpretation is replete with instances of disappointment which visitors suffer when they are left to the mercies of malfunctioning, temperamental gadgets (AMISOL, 1965).

Gadgets, then, are merely tools to be used. They are not meant to take the place of an interpreter. The staff at our center will have many duties to perform. Audio-visual devices can help in the task of interpreting nature.

The overall goal of audio-visual devices and machines, as well as the building, must remain a sort of mental gateway to prepare the mind for the real attractions outside. Films, slide shows, and other devices at the center are inducements to go outside and see for oneself that the outdoors is a place of interesting action (Edwards, 1971).

An AV Program for Jordan Park Nature Center

A variety of audio-visual programs can be a part of the overall interpretation at the Jordan Park Center. Such programs should be put into operation by the center naturalist as time, budget, and other priorities permit. It should be kept in mind that some of the ideas listed here are merely suggestions that the naturalist may follow or modify as he sees fit.

Slides are a valuable communications medium, and they can be used in a number of ways such as in automatic slide shows, for illustrating lectures, and for aiding in identification of animals, plants, and other features of the park. Most visitors to nature centers are accustomed to the use of slide presentations, and they seem to enjoy these programs.

We believe that the naturalist should build and maintain a collection of slides for use at the center. Generally, slides are inexpensive to take and develop. The naturalist should have copies made of slides taken by other people (about 25 cents apiece to duplicate), and he should use his own camera, or a camera purchased by the center, to build up a slide collection. Camera makes and models vary, but most people who take slides for professional purposes favor a single lens reflex camera which may cost around $200.

There are several ways in which a slide program will fit in at Jordan Park.

A continuous slide program will be set up for visitors in the exhibit room. Slides used for this purpose will tie in with the displays to present a "living wall" idea. The slides will help to set a mood by including outdoor scenes, changing seasons, and macro- and microscopic plant and animal themes. A Carousel slide projector will be placed on top of the fish display (Point E) and will be beamed onto a projection screen which will hang from the ceiling or wall at Point N. (See Illustration 21 of the floor plan in the Display chapter).

A Kodak Carousel projector (such as a Model 850H) will cost from $200 to $245, depending on the lens used. A projection screen, such as a Da-lite Deluxe Model B (available from Moen Photo Service in LaCrosse, Wisconsin) will cost from $45.85 (50 x 50) to $69.40 (70 x 70), depending on the size needed for the room.

Actual slide lectures will be given to school classes and to other groups that come to the center for a specific program.

These lectures will be given in the warming room (see Illustration 14 in the Interior Concept chapter of the plan). A projection screen will be hung on the wall. A Kodak Model 850H Carousel projector will be purchased for this room too. This projector will also be available for the naturalist to use if he is invited to speak at schools or before various community groups.

On weekends, a slide-tape program can be presented in the warming room for the general public. Such a program would last from eight to ten minutes and would be shown soon after the center opened or during the late afternoon. The naturalist could set up the program and could then go about his other duties. If such a program proves to be popular, it could be shown several times on a weekend.

Devices for presenting slides synchronized with sound are now available in a variety of forms. This allows the quick substitution of one program for another, permitting the presentations to be tailored to the needs of the moment (Field and Wagar, 1973). Such a program can be made by an amateur on a reasonable budget and still be a project of professional quality (Newkirk, 1968).

Slide-tape programs can be made with either two or three machines. Newkirk (1968) used a 35 mm. Kodak Carousel projector, a Wollensak tape recorder, and a synchronizer. However, when you browse through more recent AV catalogs, you will find that a Kodak Carousel, such as the Model 850H, can be combined with a Wollensak 3M cassette, Model 2550, which costs about $300, or a Montage Audio/Mate 530 which costs $199.50. We favor the use of a Kodak Carousel and a cassette device, such as the ones mentioned here, as this involves only two pieces of equipment.

Once a program is set up, it can be used over and over. A box of slides and a tape or a written script could even be loaned out to schools and community groups.

A supply of projector bulbs and extra Carousel trays should be kept on hand. The naturalist must be trained in how to change the bulbs and to make minor repairs on the projectors. Provisions for the replacement or loan of a projector should be put into the contract when the two Carousels are purchased, so that a spare is available if and when a machine needs to be sent out for repairs.

The themes for slide-lecture programs at the center are endless. Topics could include a trip down the Plover River, spring wildflowers, songbirds, or interpreting the urban environment. A sample script for this last topic is included as Appendix B.

Audio Programs

Audio stations are frequently found on trails and in centers. The National Park Service claims that these stations are equally effective indoors and out if the subject is interesting to look at while visitors listen to the story. Erskine (1964) reports that visitors will listen to messages that last as long as three minutes.

Although widely used in interpretation, audio stations are expensive to buy and install, and they require more maintenance than a sign or a label (Erskine, 1964). We will make limited use of audio stations and programs at Jordan Park. Due to a limited budget, audio programs would probably not be implemented until the center program is well on its way.

An audio station will be used in the alcove to enhance the atmosphere of the woodland setting that will be created indoors. This station will feature a number of sounds that will be changed with the changing seasons. Spring birds and frogs, summer insects and whip-poor-wills, migrating geese and the forlorn chirps of fall crickets, and the calls of our winter birds and the sounds of winter winds will be heard. Although such a device could be played continuously, it would probably be an overload to most people. We plan to have the device located in a position where an adult or a child could push a button to activate the recorder.

Since the Jordan Center has a small exhibit room and a small budget, we decided not to include audio stations in that room at the present time. A series of such stations would be far too expensive to purchase and implement, and due to space requirements, would probably cause people to jam up in places.

The National Park Service recommends that indoor audio stations have individual handphone listening devices to pick up the audio message instead of a loudspeaker which can be intrusive and objectionable in a room with more than one station (Erskine, 1964). We will be getting many visits from children, and based on our personal experience, children often lack the patience to wait for another child to finish hearing the message. Pushing, squabbling, and even an occasional punch may result from kids waiting to hear a message. Therefore, we believe that handphones are not always suitable listening devices.

In the future, it may be possible for the naturalist to put in an audio station with small, single earphones or even a low-volume loudspeaker by the honey bee exhibit. Bees are popular, and people want to know more about them. An audio station, with a brief message, could help to interpret the bees. A suggested script can be found in Appendix B. It could be called "The Amazing Ms. Honeybee." Since worker bees are females, a woman's voice will be needed to record the message.

Mahaffey (1969) found that most people visiting an interpretive facility were more receptive to recorded messages than to signs and leaflets. A recorded message was enjoyed and understood with little effort exerted by the listener. He found that most people desire a combination of interpretive media in comparison to a single medium. People liked the variety of having an opportunity to learn by more than one medium.

A trail booklet has been designed by Portage County Preservation Projects for use on the park nature trail. Since Mahaffey's research (1969) points out that many people do not become involved with a leaflet or booklet, we would like to utilize a variety of interpretive techniques on the trail in keeping with his findings.

Most of the interpretation for school groups will probably be done by naturalist-led walks, which is the best means of trail communication. In addition, a trail booklet should be available to serve the general public, families, and scout groups.

In the future, audio stations could be set up at two places along the trail. We think the recorders should be removed at night to prevent theft or vandalism, although it will mean extra work for the staff.

A recording station could be set up in the staging area (see Exterior Concept chapter), so that families and unsupervised groups using the trail could push a button to hear a message about trail manners. An animal common to the park, such as a crow, could be personified to give trail rules in a more positive and personal manner than a sign or a leaflet. Carl Crow could tell visitors that "it's a pleasure to have you in my home, feel free to look at my friends who are rather shy, are frightened by noise, and who don't like being disturbed anymore than you do in your own house." The volume of this message should not be heard all over the grounds; it must not create unnecessary noise and should not be louder than the naturalist's normal speaking voice.

A recorder could be placed on the trail near the old fire trenches that were plowed by a forest ranger in 1963 to stop a runaway fire. A male voice could tell what happened, and in the background you would hear the sounds of flames and a caterpillar tractor.

The combination of booklet, signs, and recorders will utilize several communications media and will provide variety.

Rather than recommend a specific type of message recorder, we think that the naturalist should write to other centers to find out what types of recorders they are using and how well they hold up. We also think that the naturalist should contact Columbia Scientific Industries, Austin, Texas, which sells an Audion Model 16 continuous loop message repeater for $99. This unit looks like it might be appropriate for use at the Jordan Center.

A few signs should be placed on the trail at certain spots such as at the bird feeder. The sign could aid in the identification of seasonal birds coming to the feeder or to show different types of home-made bird feeders.

A rotary flip display will be made for the alcove. It will feature pictures of birds and will be next to the bird-viewing window and the telescope, so that people watching the birds will be able to identify them. The bird pictures can be mounted on panels and then covered with glass or plastic. Visitors could page through this display as if they were paging through a large book.

An overhead projector should be purchased in the future for instructional purposes. With grease pencil and clear acetate sheets, the naturalist could project written messages and drawings on the projection screen in the warming room. Besides showing transparencies, it can be used for projecting biological objects such as living organisms, preserved specimens, and plastic-embedded specimens to school groups (Frazier, 1970). A 3M overhead projector costs $149.

As the interpretive program grows at Jordan, the naturalist should look into the possibility of purchasing a 16mm movie projector, which would cost from $700 to $1700, depending on the model and make. It might be better to look into the possibility of purchasing a Super 8mm projector, which will cost at least $300. Super 8 projectors are improving and should be better in the years ahead, with a larger film selection to choose from.

The naturalist should consider the purchase of a Super 8 or 8mm loop-cartridge projector system which offers short films, seldom over four minutes in length. These units show single concepts such as food webs or insect life cycles. One of these units could be set up as part of the bee display to show aspects of bee communication. Such a system could also be used for special exhibits such as a display on Indian artifacts that were found in Jordan Park. It should be possible for

UWSP Communications students to take 8mm footage of an archaeological dig which could be put into a cartridge by a film lab. A projector and desk top viewer would cost about $225. Ealing Films, 2225 Massachusetts Avenue, Cambridge, Massachusetts, 02140, is one of many companies to write to learn more about 8mm film loops and projectors.

A portable cassette tape recorder can be useful for recording comments and lectures which can be played back for self-improvement purposes. Taped lectures could be made available for teachers and other youth leaders to use. Makes and models are numerous, and costs could range between $30 and $70.

Collections of natural history specimens should be maintained for teaching and display purposes.

With only $750 budgeted for the audio-visual programs, it will be impossible to put all of these ideas into operation except over a long period of time. A system of priorities needs to be worked out by the naturalist and by the County Park Commission as to what and when things will be done.

The AV program that we have proposed will present a variety of learning situations and devices. Field and Wagar (1973) point out that interest is far above average for exhibits with dynamic or animated presentations such as the ones presented in our ideas. Visitors find media normally used for entertainment to be more rewarding than the less dynamic media that are traditionally used for education. We believe that slides, audio stations, films, and overhead transparencies will entertain as well as communicate nature messages.

Recommendations to the Naturalist

We believe that the naturalist should maintain a small library in his office for his own use and to aid in identifying things that the visitors see while on the nature trail. This library should contain books such as the Peterson Field Guides, the Golden Guides to field identification, and several of the Golden Nature Guides. The naturalist should trade the publications that he develops with other centers so that he can see what is going on elsewhere. He can then use these leaflets and worksheets as a source of new ideas for programs and activities at the Jordan Center.

He should contact the Wisconsin Department of Natural Resources to get copies of their educational materials and the various publications that they put out for the general public. Many of these publications deal with the state's wildlife and forest resources.

How-to-do-it manuals on exhibit preparations, taxidermy, and aspects of nature photography are also valuable.

The naturalist should join the Association of Interpretive Naturalists and should try to add this organization's publications to the center library.

The naturalist should make use of the library or Learning Resources Center of the University of Wisconsin-Stevens Point. The Park Practice Publications-Grist, Guidelines, Design, and Trends-are worthwhile sources to consult for information. They can be found in the Reference Room at the library. They are published jointly by the National Conference on State Parks, the National Recreation and Parks Association, and the National Park Service. They contain ideas and how-to-do-it articles that pertain to AV programs.

He should also browse through the following journals which contain many articles on interpretation, outdoor and environmental education: Journal of Environmental Education, The Science Teacher, and The American Biology Teacher. American Education is also useful and can be found in the Documents Room of the library.

The naturalist should refer to the following sources for help in selecting and using AV equipment:

1. Brown, James W., Richard B. Lewis, and Fred F. Harcleroad. 1969. AV instruction: media and methods. McGraw-Hill Book Company. New York.

2. National Audio-Visual Association, Inc. 1973-74. The Audio-visual equipment directory. Fairfax, Va.

The naturalist should write for catalogs of rental films which may prove useful in future programs, and he should order catalogs from various companies in order to compare prices on AV equipment. A trip to the Milwaukee Public Museum and a conference with people responsible for AV devices in the Museum exhibit halls would also prove useful.

He should make use of the UWSP Communications Department. Some of the students and faculty members may be able to assist him not only through offering advice, but in making 8mm movies, and even in taping TV programs or video tape programs for instructional purposes.

The naturalist should also make use of the staff members in the UWSP Learning Resources Department and in the Instructional Media Center. Faculty and students may be able to assist him in taking slides and in the correct use of AV equipment.

PUBLICATIONS

Why should a nature center wade into an expensive program of printed publications? What are the possible benefits of such a program to the nature center and its sponsoring agencies? During our planning, we have arrived at a few purposes for a program of publications at the Jordan Park Nature Center (JPNC). Each of the purposes will be detailed in this section of the plan.

The first purpose for publications at JPNC should be to advertise the nature center. The operation of JPNC will be a new experience to most of the inhabitants of the surrounding area. Information should be presented to the general public in the form of press releases, media coverage, and publications.

A publication we suggest for the above purpose is a general advertising pamphlet to be available to the public through the Portage County government offices and such agencies as the Chamber of Commerce. The pamphlet should be attractive, colorful and should effectively advertise JPNC. Graphics should be used generously, particularly in the first panels of the pamphlet. Good examples of the use of non-verbal graphics are the current Trees for Tomorrow Environmental Center pamphlet and the Seven Ponds Nature Center advertising pamphlet. (Complete addresses can be found in the References Cited.) Both publications have attractive front panels. At first opening, the brochures have over 50 percent of the space used for graphics to draw the reader deeper into the publication.

We consider a 8½" by 11" pamphlet folded into thirds to be a handleable size and workable format for the advertising publication. The brochure might contain:

1. A map of the nature center grounds and location of facilities available at Jordan Park.
2. A map showing the location of the nature center in relation to Wausau, Stevens Point, etc.
3. A title showing action or involvement like "Center for Adventure" used on the Kalamazoo Nature Center pamphlet (see References Cited).
4. Numerous photographs and visuals of the inside and outside aura of JPNC.
5. A list of the sponsors of the nature center (Portage County Parks).
6. Phrases similar to that suggested by Portage County Preservation Projects--"Touch with the eyes, see with the heart."

This advertising pamphlet should be printed by a professional printing company. Cost estimates for a one color pamphlet in 10,000 copy volume range between $150 and $250 at printers in the Stevens Point area.

Another publication that would serve the purpose of advertising JPNC is an informational-orientation packet. Much of the visitorship of JPNC will be, at first, school children. This orientation packet could be used both to advertise nature center programs to area schools and to inform the schools of specific program details before they arrive at the center. An excellent example of an orientation publication is put out by the U.S. Forest Service VIS Center at Watersmeet, Michigan (see References Cited).

A last publication that could be used to advertise the center to prospective sponsors is an annual report. Sponsors would be interested in such things as visitorship, man hours of operation, and financial aspects of the nature center. An annual report could fulfill these functions.

The second purpose for a publication program at JPNC is to provide souvenir items when the visitors leave the center. A souvenir publication could be useful to people in spreading the JPNC operation by word of mouth to friends and neighbors.

The publication we suggest for the above purpose already exists in the form of a trail guide booklet (Portage County Preservation Projects). We suggest a few modifications on the existing booklet to dress it and perhaps make it more effective. The major suggestion is to use more explanatory graphics and lively language in the booklet. To keep the long range cost of revising the booklet down, we suggest drawings instead of photographs as graphics. The trail guide booklet from Trees for Tomorrow (see References Cited) did not have its photographs revised during a recent up-date and the older clothing styles detract from the effectiveness of the booklet. By using art work graphics, JPNC could easily revise the booklet without the considerable cost of new photographic plates.

Perhaps different types of booklets could be developed for the various trails at JPNC. For the Wilderness Trail we suggest a trail without signs and a trail leaflet that graphically and verbally describes distinctive landmarks. This approach would build involvement of the participant into the outdoor experience.

The souvenir trail booklets could be dispensed from the naturalist's office at the nature center. A box may also be placed at a suitable location near the trail entrance to dispense the booklets when the center is closed. The cost for the publication ($150-$250) would be justified by the benefits of advertising.

A third purpose of publications is for interpretive exercises for groups attending the nature center. The JPNC could easily provide these activity-oriented exercises. Time can often be saved by using a handout sheet describing the exercise. The publications can be produced inexpensively with a mimeograph machine available at the Portage County Building.

A fine series of activity-oriented exercises has been developed at both Trees for Tomorrow in Eagle River, Wisconsin, and by Project ICE (Instructional Curriculum Environment) from CESA 3, 8, and 9 headquartered in Green Bay, Wisconsin. Perhaps these agencies could be consulted for further information on this purpose of publications (see reference).

The last purpose for a publication program at JPNC is to publish leaflets and natural history notes that could be used in providing further information about aspects of JPNC. These publications should correspond to the nature center's facilities and displays. Good examples of this type of publication are the series of Park Interpretive Bulletins put out by the Lake County Metropolitan Park District of Painesville, Ohio, and the leaflets published by the Huron-Clinton Metropolitan Authority in Detroit, Michigan (see reference). Again, these leaflets could be produced inexpensively by the use of a mimeograph machine.

We suggest leaflet titles that denote involvement. Here is a list of possible leaflets that apply to JPNC:

1. How do bees make honey? (bee display)
2. How do birds communicate? (bird feeders)
3. Who were the first residents of Jordan Park? (archeological diggings)
4. Making electrical juice from water. (history of power production at Jordan Pond)
5. What tree is it? (simple keys and checklists for trees)

These topics are related to the Jordan Park area and the nature center. Many other topics could be covered in these small one-page leaflets. One suggestion, however, is that the style of writing should be active and lively to "turn the people on" to nature.

These small flyers would provide considerable relief to a naturalist stationed at the center. Under crowded conditions, it would be easier for the naturalist to hand out a written explanation of a display (such as the bee hive) to those interested. This action would free the naturalist for contact with more people. The leaflets could also be used as a handout to those requesting further information than is available at the display.

Such small and inexpensive publications could prove to be valuable in the total operation of the nature center.

These, then, are four purposes of the publication program at the Jordan Park Nature Center. We have a few additional suggestions to relate that may keep the cost of printing down.

Technical Suggestions

Printing costs are considerably less when the copy material is photo-ready for offset printing. Someone on the center staff capable of journalistic design and technical preparation of copy would be valuable. For preparation of center publication material, a few items aid in quality offset printing. These materials include:

1. electric typewriter with a carbon ribbon
2. press-type letters for headlines
3. rubber cement
4. graph paper with one-fourth inch grid
5. large sheet of glass and a desk lamp
6. India ink for graphic work
7. clear tape and other usual office supplies
8. a graphic file from old magazines, advertisements, etc.

With the above materials, the nature center could prepare many of the publications we have suggested to the photo-ready stage. This action would aid the printer and reduce the cost of printed materials.

Another measure to keep the cost factor under control is the use of applicable publications from other agencies. Many pertinent pamphlets and brochures are available through the Wisconsin Department of Natural Resources, the University of Wisconsin Extension, and other agencies that could supplement JPNC.

Priorities

We fully realize that to jump into a publication program would be extremely expensive. Therefore we suggest a priority listing of recommended publications, listed first to last:

1. Advertising pamphlet
2. Updated trail guide booklet (with graphics)
3. Final version of the orientation packet
4. Activity-oriented exercises
5. General informational leaflets

The basis for developing priorities in the above manner lies in the amount of public contact associated with the publications. The first two priority items require contact with the media and people. The remaining publications show respectively, more to less, personal contact with groups attending the center.

In conclusion we would like to state that the above proposals should not be considered final. Any program or publications should be dynamic enough to adapt to changing displays and changing environmental concerns.

BEST COPY AVAILABLE

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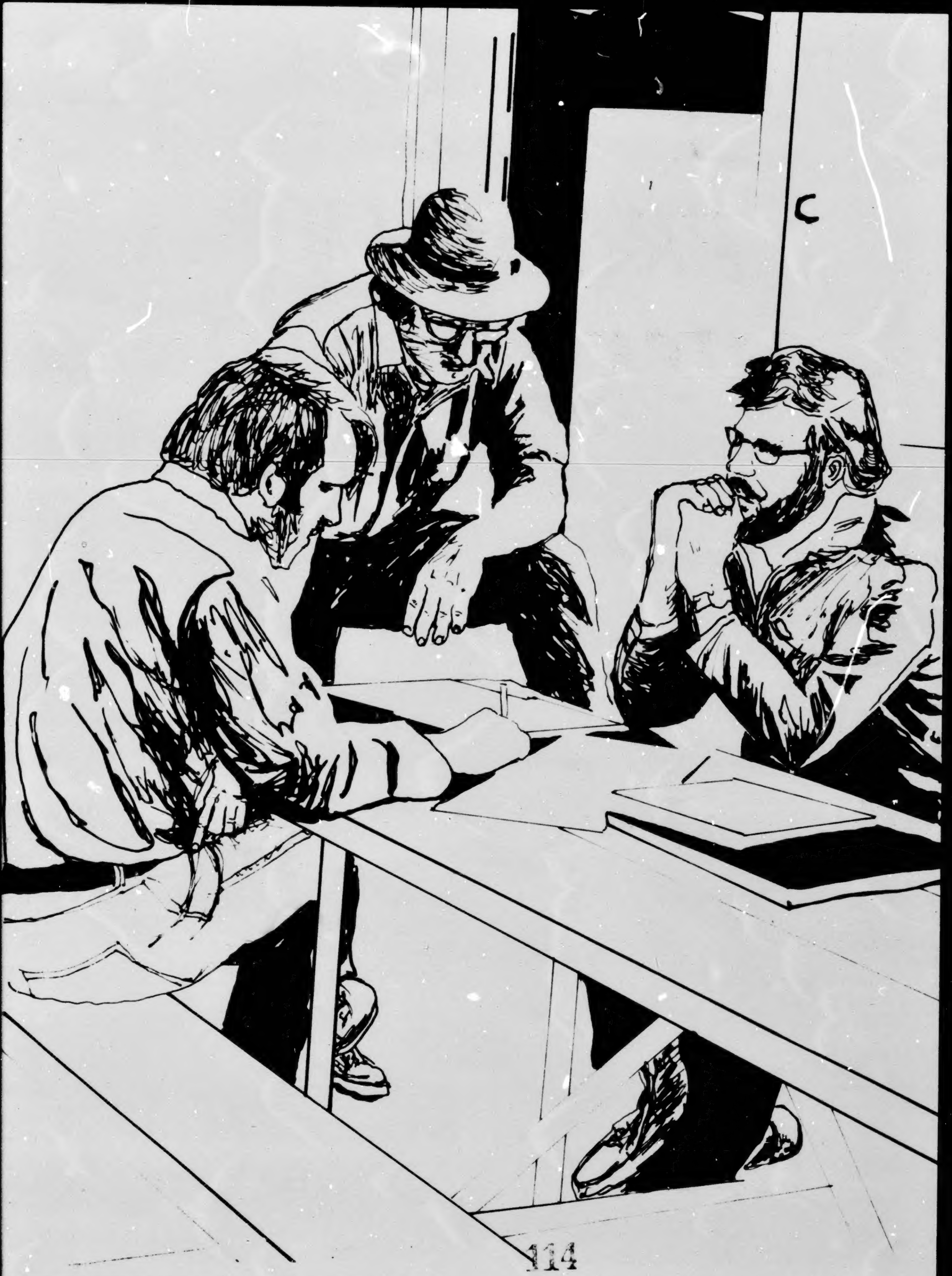
PROGRAM OPERATIONS

Larry J. Hendry

Eugene Tubbs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What is this life, if full of care
we have no time to stand and stare

No time to stand beneath the boughs
and stare as long as sheep and cows.

No time to see, when, woods we pass
where squirrels hide their nuts in grass

No time to see, in broad daylight
streams full of stars, like stars at night

No time to turn at Beauty's glance
and watch her feet, how they can dance.

No time to wait till her mouth can
enrich that smile her eyes began

A poor life this if, full of care
we have no time to stand and stare

LEISURE by W. H. Davies

Philosophy and Objectives

Our quality of life is in danger if we do not provide opportunities to escape the rigors of modern society. We all need a place to visit where we will have time for reflection--reflection on our lives and our place in nature. We need a place where understanding and an appreciation of nature can be seen, revealed, and further developed (Brooks, 1968). In order to meet the present and future needs, it is imperative that we act now in establishing such a place--the Jordan Park Nature Center.

A nature center is a facility established for the purpose of providing an opportunity for individuals of the community to gain an awareness of nature and to develop an environmental conscience.

The basic purpose of a nature center is to provide an area of undeveloped land where facilities and services are combined in interpreting nature and man's role in the environment (Ashbaugh, 1971).

In specific terms, the Jordan Park Nature Center shall exist as an educational and recreational facility for the public at large. Efforts shall be made to meet the needs of all visitors. The nature center shall provide supplemental educational opportunities for children in grades K-12. Beyond this, the nature center shall provide a broad range of programs ranging from school programs to adult programs. In addition, special programs for other groups such as senior citizens and handicapped individuals shall be introduced.

Policy Statements

The naturalist(s) at the center should adhere to the guidelines as listed in the policy statement. The Naturalist I (Nature Center Director) shall be employed by and responsible to the Portage County Park Commission. Preferable qualifications of the Naturalist I are as follows:

1) B.S. or M.S. degree in ecology, biology, natural resources, education or a closely related field with mandatory experience or training in environmental interpretation.

2) Must be a good speaker who can arouse the curiosity and interests of people (Carr, 1968).

3) Must enjoy working with people.

4) Must be willing to assume responsibilities.

5) Must be able to direct and supervise other personnel.

6) Must be able to prepare budget statements, conduct necessary correspondence, and prepare reports and records.

7) Should have knowledge of a variety of subjects (photography, painting, taxidermy, etc.).

The following briefly lists some of the duties and functions of the Naturalist I and other center personnel:

1) The Naturalist I shall hire a Naturalist II as an assistant. This person shall approximate the qualifications of the Naturalist I as nearly as possible.

2) The Naturalist I shall hire all other personnel who are hired exclusively for the Jordan Park Nature Center.

3) The Naturalist I shall oversee the work of all other personnel while working at the center.

4) At least one person employed at the center should have had first aid training.

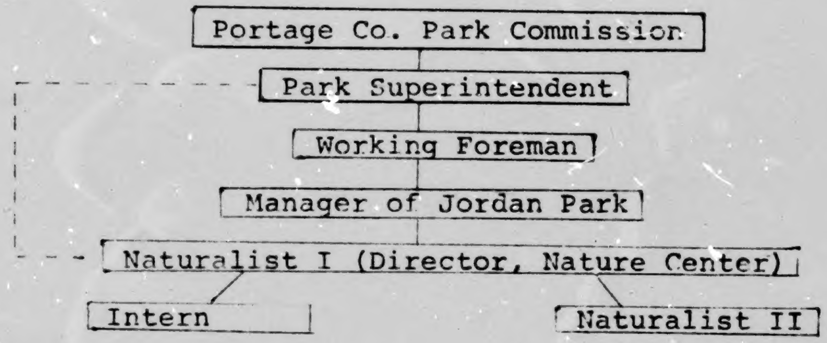
5) The Naturalist I and his staff shall to the best of their ability include a broad range of programs at the nature center.

6) To make the staff member appear more imageable as a professional, nature center uniforms should be designed.

7) The Naturalist I will be responsible for all reports, publications, and communication with the local news media.

8) The ultimate authority at the nature center will be exercised by the Naturalist I. He in turn has to answer to his superiors.

9) Listed below is the organizational structure of the park system of Portage County, Wisconsin, as it relates to the Jordan Park Nature Center.


Portage Co. Park Commission
Park Superintendent
Working Foreman
Manager of Jordan Park
Naturalist I (Director, Nature Center)
Intern
Naturalist II

10) The Naturalist I shall issue an annual report to the Portage County Park Commission. It shall contain financial information, progress reports on development of programs, and any other pertinent information. Any conflict or problem encountered at the center by an employee or visitor should be immediately referred to the Naturalist I for resolution.

11) Visitors are expected to conduct themselves in the proper manner while at the center. To aid this, visitors should be politely made aware of the nature center rules.

12) The proper authorities should be immediately notified in case of any fire or other major disturbance at the center.

Funding

Primary - Appropriations for the establishment of the Jordan Park Nature Center will be administered through the Portage County Park Commission. The Portage County Board of Supervisors is responsible for approval and allocation of funds for the Park System. Estimated construction costs for the facility (physical plant) are projected at between twenty and fifty thousand dollars (see Tables 6 and 7). Funds should be allocated in increments of five to ten thousand dollars per year and will be used over a period of five to ten years. Use of the above format will allow for careful and efficient planning in developing specific phases in construction of the facility. Hopefully, projected phases of construction can be coordinated, as this will allow for continuous growth and development of the center's master plan.

Secondary - The park director and the naturalist should consider and evaluate the following alternatives for soliciting additional revenue and support for the center.

1) local conservation or service clubs (Lions, Ducks Unlimited, Issac Walton League, etc.)
2) youth groups such as the YMCA
3) businessmen, companies, and corporations (pulp and paper companies, insurance companies, etc.)
4) concerned citizens
5) establishment of membership drive
6) schools for possible compensation when utilizing the center as part of their education program
7) a foundation which would serve as a resource base for both financial and community support (excellent potential).

All donations should be accepted without any stipulation as to their utilization. The Naturalist I should establish a policy of accepting only those donations which will prove valuable to the center's operation.

Staffing

Center Staff - The operation of the center as proposed in this survey can be accomplished only with the experience and

TABLE 6

Physical Plant (Estimated Capital Investment)

Cost Item	$ Amount
Parking Lot	2,000
Sign	100
Landscape and Walks	1,000
Office Equipment	1,000
Displays	1,000
Utilities	500
Wiring	1,500
Tools	300
AV Equipment	750
Interior remodeling	7,500
Fireplace	2,000
Additional Construction	5,000
Heating-Plumbing	10,000
Contingencies	1,000
	$33,650

TABLE 7

Estimated Annual Operating Budget

Expense	$ Amount
Naturalist I	11,000
Naturalist II	4,000
Insurance	400
Utilities	500
Travel	200
Materials/Supplies	900
Telephone/Postage	500
New Equipment	1,000
Other	1,000
	$19,500

knowledge of a trained naturalist. Thus, considerable attention should be directed toward the hiring of a professional naturalist who can plan, coordinate, and operate a program aimed at achieving the objectives of the center. Beyond the full-time Naturalist I,* a Naturalist II** should be employed for the period of mid-April through mid-September. In addition, university interpretive interns could supplement the center staff.

University Intern Program - The College of Natural Resources at the University of Wisconsin-Stevens Point operates an intern program. This program would lend itself to student participation in the interpretive center. Students would receive an opportunity to apply principles learned in the classroom to practical experiences in the field. Two to six semester hours of credit would be earned (in total) after successfully completing the program.

A professor in Outdoor Recreation/Environmental Education and the Naturalist I would observe, instruct, and evaluate the student. Eligibility for participation in the intern program would be determined by the university. Class standing and curriculum major would be determining factors in student selection. The Park Commission might explore the possibility of providing the student with some kind of financial assistance. The intern would work at the nature center along with the Naturalists I and II.

Pre-Orientation Programs for Schools

The development of pre-orientation packets for schools should provide the following information:

Orientation to facilities located at the center

1) A map of the nature center and the surrounding landscape
2) Types of displays and exhibits incorporated into the center
3) What there is to see in the outdoor area (trail, animals, etc.)

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* The Park Commission might recommend to the county school superintendent that the Naturalist I be hired in a quasi position of teacher/naturalist during the initial operation of the center.

** Naturalist II would be part-time and/or seasonal employee.

Preparation

1) Timetable of expected arrival of school group
2) Dress according to season
3) Customs, or regulations to observe while visiting the center
4) Class activities or discussions which the teacher might use in preparation of their pre- and post-visit experiences

Pre-orientation packets would be forwarded to schools that expressed a desire to have children visit the nature center. Additional information and materials, such as slide programs or bird lists, should be available upon request.

Visits to the schools by the Naturalist I or II during the winter months are encouraged, if the schedule permits. When visiting the schools, the naturalist should explore the possibility of utilizing slide programs, films and small portable displays.

Updating Displays

Displays can provide a very valuable medium through which themes, concepts, and ideas are actualized. However, displays should not remain stagnant and singular in design (Hanna, 1971). The updating of displays is recommended for the following reasons: 1) to allow for a variety of topics and schemes in response to phenological events, 2) to allow for expression of new ideas and expansion of popular environmental issues.

The Naturalist I will have the authority in deciding which displays should be rotated, modified, or constructed. He should strive to get reactions from visitors about existing displays and suggestions on new ideas for displays. The frequency of updating will be determined by the Naturalist I. The information and ideas for updating should be gathered during the year for the purposes of review and evaluation in the off-season. The construction of a few alternate displays is recommended in the event existing displays are damaged or become inoperative.

Hours of Operation

The hours of operation at the nature center were designed in an effort to provide every citizen an opportunity to use the center's facilities. These hours will be limited to some extent by the available manpower employed at the center. Listed below are the proposed hours of operation.

	Weekday	Weekend
June-September	10 a.m.-4 p.m.	10 a.m.-6 p.m.
October-May	9 a.m.-4 p.m.	10 a.m.-4 p.m.

Field trips and guided tours for community groups, organizations, and schools will be made on an appointment basis only by the Naturalist I. These tours can be conducted on either weekdays or weekends. Nature center programs given indoors will follow the same format as mentioned above.

In order to provide continued supervision by staff members at the center, the following shared work schedule is suggested:

		Weekday	Weekend
June-Sept.	Naturalist I	10 a.m.-4 p.m.	10 a.m.-6 p.m.
	Naturalist II	1 p.m.-4 p.m.	10 a.m.-4 p.m.
Oct.-May	Naturalist I	9 a.m.-4 p.m.	12 noon-4 p.m.
	Naturalist II	9 a.m.-12 noon*	10 p.m.-4 p.m.

The nature center will operate on a six day work week which we believe allows maximum time for utilization by the general public and schools. The center will be closed every Monday. Each naturalist will assume full responsibility for operation of the center every other Sunday. This will enable the naturalist to have two consecutive days off from work every other week.

Maintenance of Center

The responsibility of maintenance of the nature center and the adjacent grounds will fall under the direction of the Naturalist I. Duties will be delegated by him as to which staff member (Naturalist II or intern) is responsible for performing maintenance duties in different areas of the center. Janitorial work in the building shall be under the direction of the Naturalist I. He shall set the policy as to janitorial duties and shall adjust them as he sees fit.

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* During the off-season the Naturalist I could give school presentations while the Naturalist II is on duty.

A suggested breakdown of maintenance duties are as follows:

1) Naturalist I - supervision of maintenance duties; maintenance of displays, audio-visual equipment, supplies, materials, and the naturalist's office.
2) Naturalist II - primary maintenance of trails, bird feeders, outdoor displays and exhibits, and internal housekeeping (cleaning floors, restrooms, etc.).
3) Intern - assist both naturalists in performing maintenance as directed.

The Naturalist I might, if desired, solicit the support of various community groups and schools in conducting an annual clean-up of the entire nature center area. The objective of this project would be to get the community involved in helping and contributing to the welfare of their nature center.

Stages of Development

It is recommended that the projected completion and working operation of the nature center be accomplished in several phases. This will allow for careful planning and evaluation of the center's needs.

Planning Committee (1974) - planning of overall construction, operation, and development of the center (presently being conducted as embodied in this plan).

Phase I (1974-75) - wiring, plumbing for aquaria only, seal windows adjacent to highway, planting of shrubs and trees, construction of temporary displays, trail development, utilization of university intern.

Phase II (1975-76) - acquisition of A-V equipment and aquarium, construction of inner display wall, bee hive, and displays,* hiring of full-time Naturalist I.

Phase III (1977-78) - alcove and windows, entrance baffle, construction of naturalist's office.

Phase IV (1979-80) - major construction and plumbing,** remodeling of interior.

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* Naturalist and intern will use present warming room for workshop area.

** Consists of addition to building, construction of restrooms and workshop, and installation of heating system.

Phase V - (1981-82)	additional A-V equipment, trail improvement, completion of warming room, hiring of Naturalist II.
Phase VI - (1983-84)	office equipment, completion of parking lot, landscape.

The above phases of development can be accelerated if completion of any one phase occurs before termination of the specific time frame. By the year 1985, the total implementation and operation of the Jordan Park Nature Center should be a reality.

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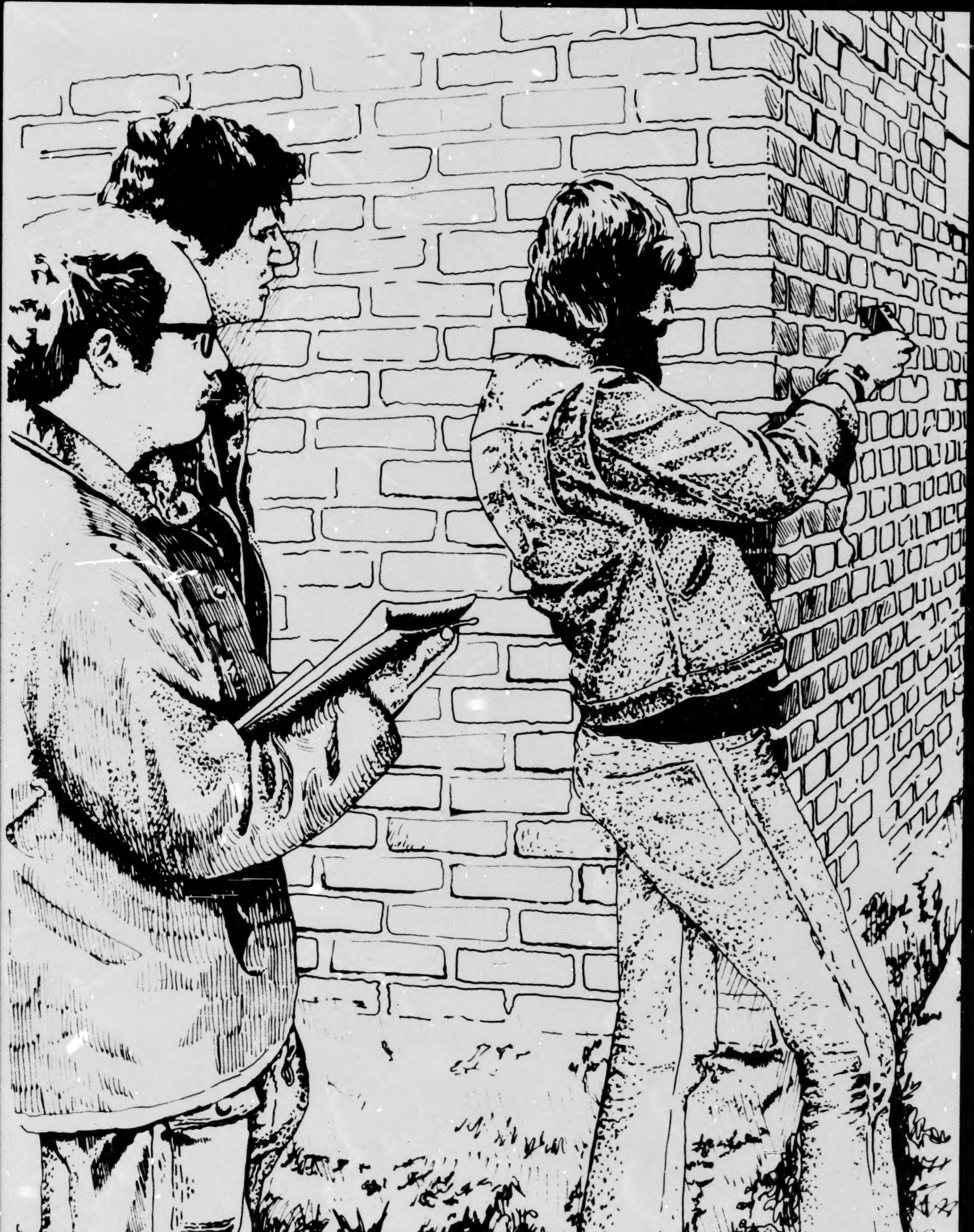
INVENTORY

Sally K. Freckmann



Central Wisconsin's Jordan Park is located in the Town of Hull in Section 12, T 24 N, R 8 E of Portage County. The Pulaski School was built between 1900 and 1910, and was donated September 14, 1970 to Jordan Park by the Stevens Point school system. A preliminary survey of the Jordan Park area from the past to the present is presented below.

The territory of Wisconsin was established by an act of Congress in 1836. In 1856 modern Portage County was constituted. On November 11, 1858, the Town of Hull was organized with the first town meeting at Hugh McGeer's home. The boundaries of the township changed a few times before the present shape came into existence in April of 1899.

Jordan Park probably received its name from the village of Jordan which was developed in the early 1850's and was located south of Jordan bridge on Highway 66 near the McGeer sawmill. Jordan Pond was created around 1850 when Hugh McGeer built a dam for his sawmill on the Plover River. Before this, about 1840, Bloomer and Harper built the first sawmill on the Plover River about 150 yards south of the Jordan Dam on the west side of the river (See Historical Marker south of Highway 66 on the west side). The origin of the name Jordan (pronounced Jer-dan by the early settlers) is speculative. It has been suggested by Rosholt (1959) that it was named after Jordan, New York or the Biblical city of Jordan. The oldest living resident of the Jordan village, John Ramczyk, now 86, insists that the name originated from an early settler of the area named Jerdan.

Topography

To understand the topography of the Jordan Park area, it is necessary to trace the land forms of Wisconsin from the Pre-Cambrian to post-glacial times about 10,000 years ago. The oldest topographic feature of the area is probably the Pre-Cambrian granite which was formed about 750 million years ago. At that time massive subterranean volcanic action probably occurred in northern Wisconsin producing a huge mountain range. A hard layer of granite bedrock lies about 30 feet below the soil surface at Jordan Park. This represents the remains of these ancient mountains. Before the Plover River was backed up by the dam and Jordan Pond was created, the granite layer formed part of the river bottom. As we view the rapids below the bridge on Highway 66, the outcrops of this ancient rock can be seen.

In the Cambrian (600-500 million years ago) most of the area south of the granite shield of northern United States was below ocean water. The granites were eroding away, producing sand particles accumulating as sandstone. In the Ordovician (500-425 million years ago) the mountains continued to erode, oceans moved in, and sand continued to pile up. By the Silurian (425 million years ago), the seas had become shallow. Not much sandstone was being laid down, but more limestone was deposited. By the Devonian (405 million years ago) seas had become very shallow. In addition to limestone, shale formed from clay deposited in estuaries and shallow water. From the Devonian on, Wisconsin was above sea level. Sediments eroded away slowly. At the end of the Paleozoic (280 million years ago), the Appalachian mountain range arose and land buckled in Michigan forming a basin. In Wisconsin, the land buckled up forming a dome and reaching its highest point in central Wisconsin. Erosion now occurred from the center of the dome outward. Erosion formed arcs of ridges and valleys with the steep cliffs facing the center of the dome. We may still view these erosion features in the Driftless Area in the southwestern quarter of Wisconsin where there are sharp ridges of cuestas and bluffs and narrow V-shape valleys (the remainder of Wisconsin would have tended to look like this if it had not been for glaciation).

The sandstone outliers found throughout the county are remains of the ancient Paleozoic ocean. About two miles northeast of Jordan is the old Ellis Stone Quarry off county Highway K. This sandstone was formed in the ancient sea of the Cambrian. Some layers actually show ripple marks of the wave action.

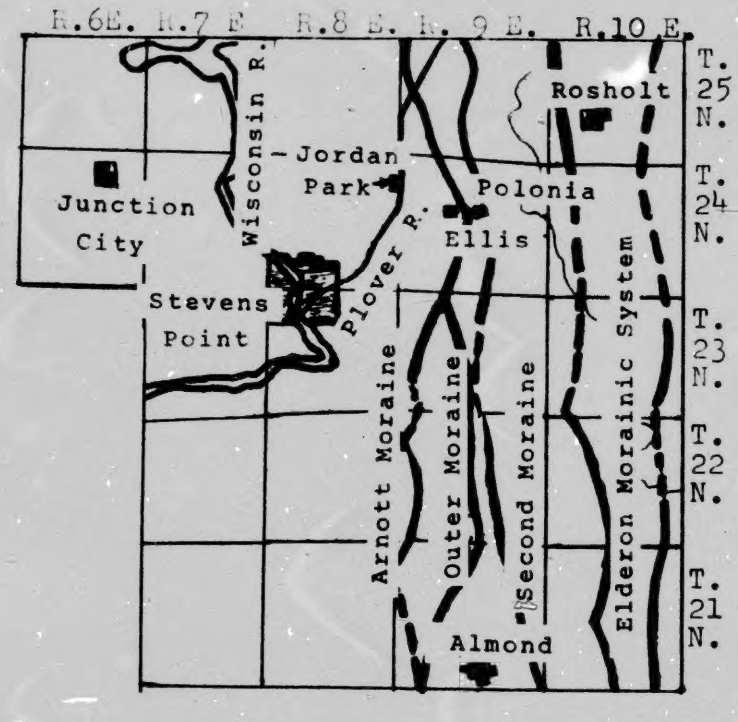
About one million years ago, severe changes of climate occurred resulting in the formation of massive glaciers in Canada. When snow and ice accumulated a mile or more in thickness the ice at the bottom liquified, allowing the glacier to creep outward. The glaciers pushed into Wisconsin following several centuries of continued ice accumulation. As the glacier spread southward across northern Wisconsin, the boulders which it carried plus the weight of the ice acted like a gigantic sandpaper by scraping away the soil and surface rocks, grinding down hills and ridges, and gouging pockets in the exposed granite. As the glacier reached warmer areas the ice at the leading edge melted about as fast as it was pushed to this point by the body of the glacier. The ice carried rock, gravel, sand, and clay. Most of the boulders and larger rocks could be moved forward only by the force of advancing glacial ice, and these were dropped at the point where the ice melted. When this line of equilibrium between the advance and the melting of the ice persisted in the same area for many years, rocks and boulders were piled atop each other forming an irregular ridge called a moraine.

The terminal moraine marks the farthest point of advance of a glacier. Recessional moraines which lie behind the terminal moraine represent lines where the melt-back of the glacier had temporarily ceased.

The area ahead of this terminal moraine is called an outwash plain and it consists of the smaller particles of glacial debris carried away from the moraine by the meltwaters. These particles are deposited in a sorted and graded series with gravel near the moraine and sand, silt, and clay extending farther out. This gradation is the result of the fact that the volume rate of flow of the meltwaters decreased farther away from the ice. As the rate of flow decreased, the water was unable to carry the gravel, then the sand, and finally the clay.

Jordan Park lies in this outwash plain. The prominent hill which runs north and south through Polonia, about four miles east of Jordan Park, is the Outer Terminal Moraine. Two prominent recessional moraines, the Second Moraine and the Elderon Moraine lie a few miles to the east of the Outer Moraine. A small terminal moraine called the Arnott Moraine is about two miles west of and parallel to the Outer Terminal Moraine in southern and central Portage County. The Arnott Moraine vanishes beneath the latter at the junction of county Highway J and Highway 10. (Illustration 26)

From this intersection we can see the effect of glaciation, either by traveling north on county Highway J or by looking at topographical maps. We can see the hills of the moraine; then the boulders on the western edge of Polonia outlining the moraine; then gravel pits as we move westward. Next comes the sand flat plains of mostly farm fields which quickly disappear and are covered by clay and muck, forming the Jordan swamp.


R.6E.
R.7 E
R.8 E.
R. 9 E.
R.10 E.
T. 25 N.
T. 24 N.
T. 23 N.
T. 22 N.
T. 21 N.
Rosholt
Wisconsin R.
Jordan Park
Junction City
Polonia
Ellis
Plover R.
Stevens Point
Arnott Moraine
Outer Moraine
Second Moraine
Elderon Morainic System
Almond

———— - - - - Boundary of Moraine. Dashed where approximate.

Illustration 26. Map of Portage County showing location of moraines. Base from Wisconsin Highway Commission road map.

The glacial history of Wisconsin, and probably that of the Jordan Park area, is complex. A simplified version will be discussed. At least four major periods of glacial build up and advance occurred in North America in the past million years. These are referred to as the Nebraskan glaciation (600,000 to 1,000,000 years ago), Kansan (300,000 to 400,000 years ago), Illinoian (110,000 to 200,000 years ago), and Wisconsin glaciation (between 50,000 years ago and 10,000 years ago). The Wisconsin glaciation, being most recent and covering the older moraines at most points in this state, is responsible for most of the prominent glacial topography. There were several pulsations of minor glacial advance and retreat within this glaciation, with each advance called a "substage." The Outer Terminal Moraine was formed probably during the Cary substage and is related to the Green Bay lobe of Wisconsin glaciation; this marks the most westerly known advance of the Cary ice sheet in Portage County (Holt, 1965). This occurred about 14,000 years ago. The Arnott Moraine belongs to an older substage.

The last geologic event to affect the topography of central Wisconsin occurred when an ice block and a small moraine dammed the Wisconsin River channel through the Baraboo Hills at Devils Lake. The river at this time (about 10,000 years ago) was swollen with the water from melted glacial ice. The water quickly backed up forming a huge shallow lake in Central Wisconsin called Glacial Lake Wisconsin. The action of water and waves broke down much of the Paleozoic sandstone from this region southward, and is largely responsible for forming the huge sand plain of the "Sand Counties." After the river cut a new outlet to the south, forming the Wisconsin Dells, the water receded. Marsh and bog plants invaded the wet sands and mucky soil came to cover these sands. Jordan Park was not affected as directly by the glacial lake as the southern portion of Portage County, for the lake extended only as far as Plover.

Around 1900 much of the marshy and wet land of the glacial lake bed and the adjacent outwash plain of Jordan was drained. Fires followed, burning off the muck and exposing the sand again. The Jordan swamp east of Jordan Pond extends for more than half of the distance to the moraine, as well as three miles to the north and six miles to the south before drainage. The northern boundary of the swamp is created by an extension of the Outer Moraine which stands ten to twenty feet above the level of the swamp and extends to the Plover River. This swamp is one area which was not completely drained or burned, and is probably typical of the low ground vegetation which the settlers found here in the last century.

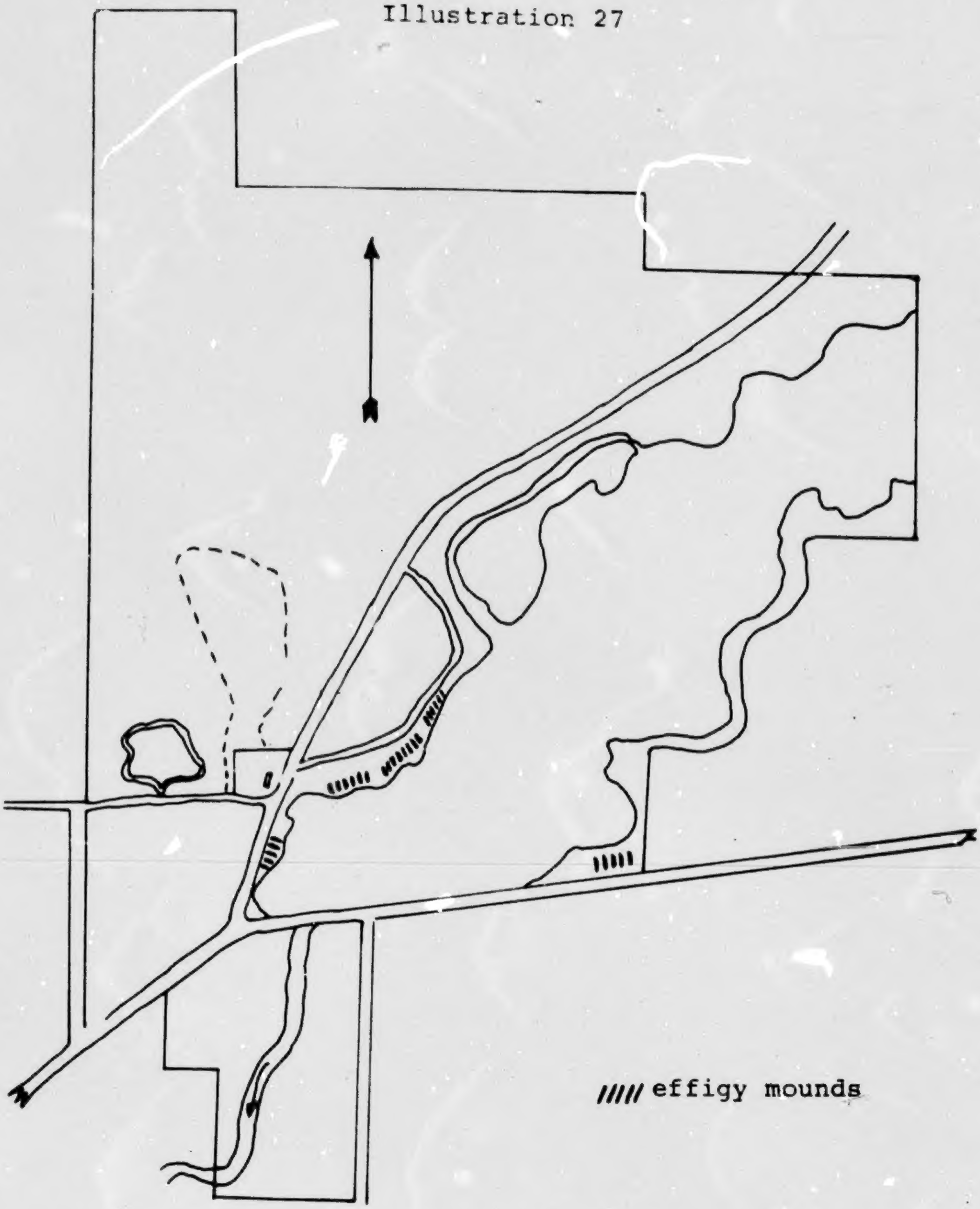
Archaeology

The archaeology of Jordan Park probably dates back to the Late Woodland Indians, 600-400 years ago. Five effigy mounds have been found along Jordan Pond as of this date (Illustration 27). John Moore and Judy Pipher from the Anthropology Department of UW-SP have been working on the large rise on the northwest bank of Jordan Pond.

Surface collecting has been done at the site for the past three years. Permission to excavate was granted in March, 1973. In two days of excavating last summer, the archaeologists found 17 fire pits, concentrations of deer bone, ceramics, and lithics.

JORDAN PARK

Illustration 27


///// effigy mounds

Three hundred ninety-seven ceramic sherds including eleven different rim styles were found from the surface to 20 centimeters deep. The pieces were enough to permit partial reconstruction of three pots.

The lithic materials included 59 pieces of chert, 45 of quartzite, 358 of quartz, and 25 of basalt. In addition to these there were what looked like the worn edge of several scrapers and a knife which had been resharpened by first striking off the worn edge. There were also an awl, the broken tip of a point, a chisel, and pieces of chlorite schist.

A number of the small stones which resemble Old World microliths (small stones used in saw-like tools) were found at a spot where a deer was apparently butchered, cooked, and eaten. Until more is found and researched, the archaeologists only say it looks like a microlithic industry may have been present in prehistoric Wisconsin. They also have 28 soil samples awaiting radiocarbon and pollen analyses. Four weeks of excavation are planned this summer on the same Jordan Park site, hopefully yielding more information on the archaeology of Jordan Park (Pipher, 1974).

Biotic Communities

A biotic community is the living and functioning of organisms within a physical environment for a period of time.

The orderly change of a community is called succession. It involves replacement, in a period of time, of dominant species within a particular area by other species better adapted to the increasing stable conditions arising.

If a disruptive factor or man does not interfere, most successions eventually reach a stage that is much more stable than those which preceded it. The community of this stage is called the climax community. The present trend is away from the definition of regional climaxes in terms of aggregations of a particular dominant and sub-dominant species, but most biologists find it convenient to recognize a limited number of major climax formations called biomes. Most references refer to seven major biomes of the world: tundra, taiga, deciduous-forest, tropical rain forests, grassland, desert, and aquatic. Most of Wisconsin is classified as having temperate deciduous forests and grassland biomes. With this introduction we need to think of Wisconsin (or still a smaller area--Jordan Park in Portage County) in terms of its biotic communities.

Curtis (1959) lists six major plant communities for Wisconsin: boreal forest, conifer-hardwood forest, southern-hardwood forest, pine savanna, oak savanna, and prairie. Most of these are subdivided by the water content of the soils. Curtis also notes that a narrow zone crosses the center of the state containing species of both northern and southern plant communities. He refers to this as the "tension zone." Jordan Park lies in this tension zone as does much of Wood and Portage County.

No part of Jordan Park fits exactly into one of Curtis' plant communities, although the area behind the Pulaski School closely resembles the northern xeric forest.

A forester may interpret this area as a sub-climax white pine stand since the foresters' classification tends to emphasize the dominant lumber species present at one time. We shall accept the classification of Curtis as a northern xeric forest.

Preliminary flora and fauna lists were compiled from naturalists' notes of the Portage County Preservation Projects, Inc. These are included in Appendix C. There is a correlation between these assembled lists and Curtis' account of the northern xeric and mesic forest community.

The most important trees found in the northern xeric forests include three species of pines: jack (Pinus banksiana), red (P. resinosa), and white (P. strobus). With these species are considerable quantities of hardwoods which include Hill's oak (Quercus ellipsoidalis), trembling aspen (Populus tremuloides), large-tooth aspen (P. grandidentata), and white oak (Q. alba). This is compared with the northern dry-mesic forest which has white pine, red maple (Acer rubrum), hemlock (Tsuga canadensis), and red pine as the associated species. Other tree species would be rare and sporadic. In the area behind the school, all the above species are included except white oak, large-tooth aspen, white birch, and sugar maple (according to the preliminary surveys).

At the time of farm settlements few virgin pine forests probably remained in Wisconsin. Those forests spared from logging may have been one hundred years or less in age. Many of the big pines cut in the heyday of lumbering could have been about four hundred years old. These big pines probably started after the widespread fires and other catastrophies of the 1400's.

Nine families dominate the groundlayer of this community floristically with one half of the total species: Compositae, Liliaceae, Ranunculaceae, Rosaceae, Ericaceae, Violaceae, Caprifoliaceae, and Gramineae. The orchids in the dry-mesic community are replaced by the ferns in the xeric community.

The important herbs and shrubs with evergreen leaves found in this community have the greatest number of plants from the Ericaceae (heath family). These common plants include the pipsissewa (*Chimaphila umbellata*), trailing arbutus (*Epigaea repens*) and wintergreen (*Gautheria procumbens*). Many of these ericads and club mosses (*Lycopodium*) spread by runners or rhizomes and tend to form clumps or small colonies. Their random distribution may be found throughout this community.

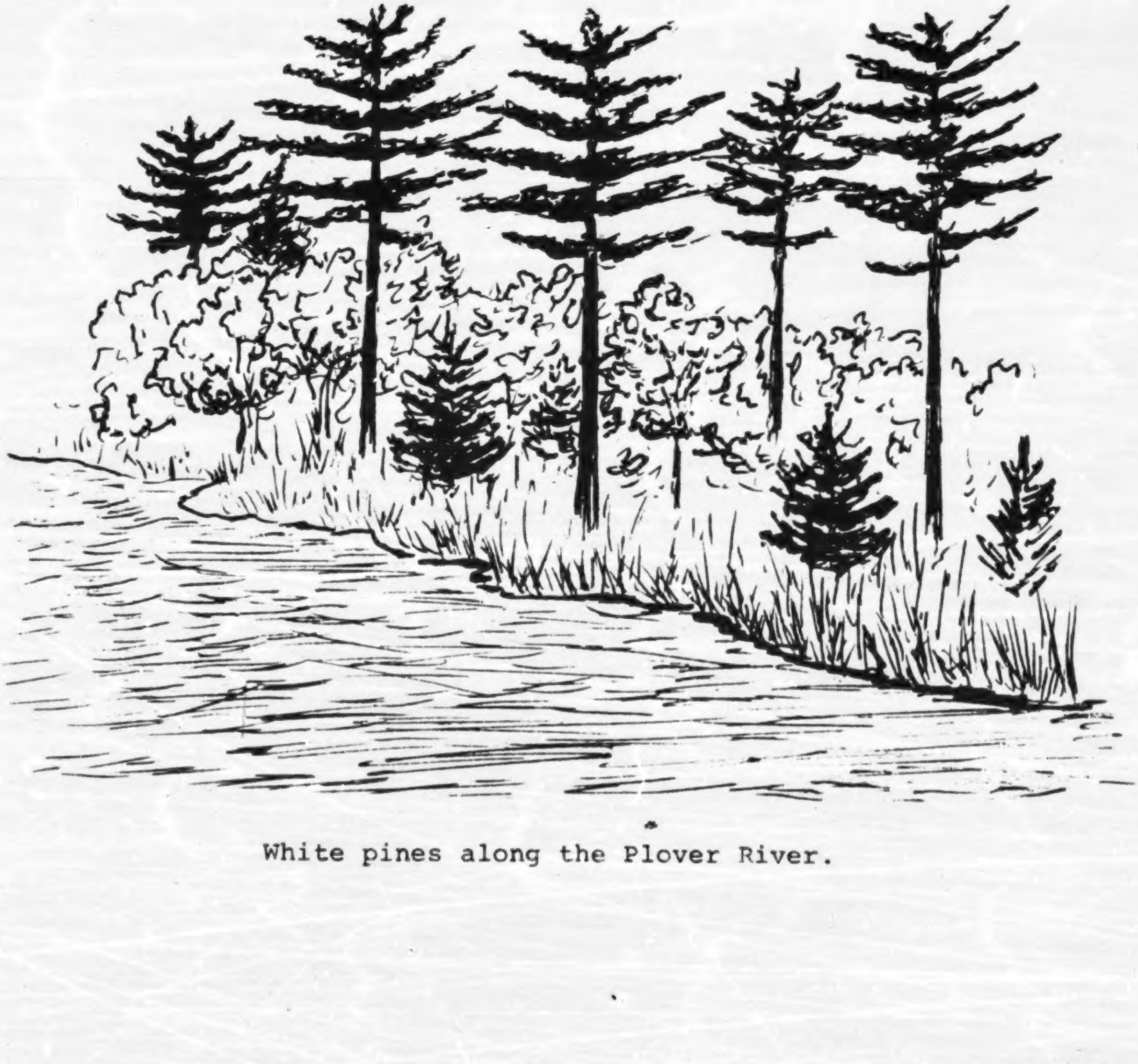
Other biota include the bryophytes, lichens, fungi, mammals, birds, reptiles, and insects. The lower plant groups have not been surveyed in Jordan Park at this date, although the dominant bryophyte families in the park are Polytrichaceae, Brachytheciaceae, and Amblystegiaceae. Curtis mentions that Culberson (1955) found evidence of host specificity of lichens, the aspens having a different flora from those of different pines. Also, Martha Christensen (1956) found the soil-fungi family Mucoraceae had the greatest effect on the initial pine stands she studied.

The animal that can be seen and heard most often breaking cones and acorns in the forest is the red squirrel. The red-back mouse and lesser chipmunk are other typical rodents to be looked for. Among birds typical to this community are the red-breasted nuthatch, warblers, and jays.

The two major soil series in this community behind the school are the Meehan and Friendship loamy sands. (Portage County soil maps, 1971). Other soil series found in Jordan Park include wet alluvial muck and Meehan loamy sands. The latter two series plus the Plainbo, Plainfield, Rockers, Friendship, and Dancy loamy sand series are found in the approximately 312 acres according to the Portage County Soil Maps, Part II. Besides these soil series (Aron, Hadek, Zumuda, 1972) the Mosinee sandy loam are found.

Alluvial soils are deep loamy soils formed in stream sediments and are poorly drained. These permeable soils have a high available water capacity and are subject to flooding (Portage County Soil Survey, Part I). For other descriptions and interpretations of soil series, we may check the references cited above.

The succession of plants and the beginning of vegetation on the outwash plain of Jordan Park probably started with the mosses and lichens. From the mosses and lichens, a simplified gradual succession would advance to forbs and grasses, shrubs, pioneer tree species in succession (aspen, willows, pin cherry, jack pine, Hill's oak, and red pine), then shade tolerant trees (white pine, red maple, white oak, and hemlock). The white pine, being the most shade tolerant tree, could have taken over and become the dominant species. Some of the white pine in Jordan Park could have been many hundreds of years in age; these are now gone. The lumbering industries along the Plover River were primarily interested in the magnificent white pines from 1840 to 1900. (Ernst, 1972)



White pines along the Plover River.

The Jordan Park area might have been one of the first areas logged, and the lumbermen probably found pine of three to six feet in diameter. When the village of Jordan was established, the south-west ten acres were cleared, later burned over several times, and then abandoned. This occurred about 1890 to 1900. (Ernst, 1972)

When an area has been cleared by forest fires or abandoned from planting, we have an opportunity to study normal succession. The first invaders will be jack pine, Hill's oak or both if the soil is sterile sand. The first invaders on heavier soils will be trembling aspen, white birch or pin cherry, and other species if seed sources were available.

Even with the fires in the Jordan area, we can still see a few of the white pine that survived. These trees were about twenty years old then and now range in age from 100 to 120 years. These pines may be seen along the trails. In addition the Hill's oak and jack pine are about 80 years old. (Ernst, 1972)

The preliminary fauna and flora lists are incomplete and a thorough study is scheduled for this year by members of the PCPP. This will only include the area surrounding the school. Within this 1.42 acres, we find the sub-climax northern forest community with other sub-communities as the fern swamp and the open, disturbed, sandy-acidic, weedy community, and a few prairie species along the roadside ditch. Across County Highway Y near the picnic area of Jordan Park, we find other sub-communities such as the shrub thicket, wet sedge meadow, duck pond slough, and the Plover River.

The fern swamp probably resulted from a combination of a topographical depression and a high water table. The disturbed open field surrounding the school includes many of our common roadside species of the county. Two interesting prairie grass species are found along the roadside: Indian grass (Sorghastrum nutans) and big bluestem (Andropogon gerardii). Their presence may have resulted from their aggressive spread and weedy tendencies, aided by a practice of early settlement time when some prairie species were used for hay to feed livestock. The above species are included on the preliminary plant list. The other sub-communities resulted from glaciation or by man and have not been surveyed at this time. The majority of these plants would not be found in the woods. We would find additional biota along the river banks, shallow areas of the river, pond slough, meadow, and shrub thicket which would not grow on the 1.42 acres surrounding the school.

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Pulaski School

The first Pulaski School was located north of the Happyland tavern (Plat map of 1895) on the road adjacent to this tavern. This is the school probably used for the first town meetings mentioned by Rosholt (1959). This school was abandoned when the new Pulaski School was built between 1901 and 1910. The former structure was torn down about 1950. Mrs. Grubba, whose maiden name was Sobish, (now 76) told us she went to original Pulaski school the first year of her learning; then to the new school after it was built for her second and third grades. There were no age limits to attend school at that time, but she thought she was six or seven when the new school was built--so the current Pulaski School may have been built in 1904.

From interviews we learned that there were schools built every two miles or not more than four miles apart when roads were ruts and transportation was by oxen or wagons driven by horses. This was around the turn of the century when public education came into existence. According to George C. Becker, now 82, this period saw the building of the present Pulaski School. The superintendent of Schools of Wisconsin was Charles P. Cary.

The roof of the Pulaski School partially burned in the winter of 1929 or 1930, according to Mr. and Mrs. Henry Sobish and Mrs. Alvina Marchel. Mr. John Ramczyk told us that the fire occurred after midnight on New Years day, since John Marchel had been watching the school until midnight because someone was stealing wood from the woodshed. During the remainder of the school year, while the school was being repaired, classes were held in the Marchel grocery store and tavern on the southeast side of Highway 66 across from the Happyland tavern. John Ramczyk was hired by the town clerk, John Marchel, to repair and rebuild the school. He added the woodshed onto the school at this time. Prior to the fire and rebuilding, the woodshed and pumphouse were on the west side of the building. The classroom was also narrowed at this time by a wall which gave the school two additional small rooms to be used for storage and a library.

During the last year of the school's operation it was incorporated into the Stevens Point school system. This became the first time in 101 years of Stevens Point school system's history that it operated a one-room school (Stevens Point Journal, September 2, 1959). Mrs. Ethel Shulfer, now teaching at McKinley, was the last teacher of the school. It was closed in the spring of 1960.

Other teachers of the school from 1920 through 1960 may be found at UW-Stevens Point Library's Documentary Section. We should refer to PORTAGE, SERIES 35, Reports and Papers of the County Superintendent of Schools, 1920-1962.

Jordan Park

Jordan Park, now approximately 312 acres, came into existence on December 5, 1961, when the Wisconsin Public Service Corporation donated approximately 113 acres of land to the county parks. In chronological sequence the additional land acquisitions to Jordan Park were:

1) Seventy-six acres were purchased from the Wisconsin Public Service Corporation on October 28, 1968.

2) The Larson property, 3.15 acres, was purchased November 14, 1969.

3) The Pulaski School and 1.42 acres were donated by the Stevens Point school system September 14, 1970.

4) Forty acres were purchased from the Wisconsin Irrigation Leasing Corporation January 10, 1972.

5) The Stuiler property, 74.92 acres, was purchased February 8, 1973.

6) The Weronke property, 3.02 acres, was purchased January 21, 1974.

The Jordan Park Nature Center and trails were initiated in January, 1972, as a joint activity of the Portage County Park Commission and the Portage County Preservation Projects, Inc. (PCPP). This initial meeting included Had Manske, Park Commissioner; Gerald Ernst, Park Superintendent; and Marguerite Baumgartner, President of the PCPP. The purposes, basic agreements and implementations were discussed. Trail development began in the summer of 1972 with clearing and marking stops of the Woodland trail by PCPP members. Numbered markers were erected by Jordan Park employees the fall of 1973.

Pilot programs were presented during the fall of 1973 along the Woodland trail with reference to the Wildlife and Wilderness trails. The first draft of a self-guiding trail guide had earlier been completed by Marguerite Baumgartner in collaboration with Gerald Ernst. Also, the first pilot program for school children at the Pulaski School was presented by

Nancy Stevenson of the PCPP in February of 1974. Other items of interest may be found in the minutes of the PCPP and the Park Commission.

A comprehensive plan for the Jordan Park Nature Center became a group project of the Nature Interpretation class of UW-Stevens Point under the direction of Dr. Gabriel Cherem in collaboration with the Nature Center Committee: Had Manske, Portage County Park Commission; Gerald Ernst, County Park Superintendent; Lee Bergman, County Park Manager, Nancy Stevenson, Chairman of PCPP Committee; and Marguerite Baumgartner, President of the PCPP. This project became a three-way cooperative effort of the Park Commission, citizen group, and a university class in creating the first active nature center program in Portage County.

People and organizations aiding or interviewed by us may be of help in future projects at the Jordan Park area. We will attempt to list these alphabetically according to subject. Additional references are listed in the bibliography.

Archaeology

John Moore: UW-SP Anthropology Department
Judy Pipher: Student of Archaeology at UW-SP

Fauna and Flora Preliminary Surveys

Marguerite Baumgartner: President of PCPP
Robert Freckmann: UW-SP Biology Department
Rosemary Rossier: Amateur Naturalist

History of Portage County

Arthur Fish: UW-SP Documentary section of library
John Fleckner: Asst. Archivist at Madison; 816 State Street
Nelis Kampenga: UW-SP Portage County Archives President of Portage County Historical Society
Malcolm Rosholt: Author of Our County, Our Story of Portage County

Residents of Jordan Park area contacted; tapes of residents that allow us to tape were donated to the Portage County Archives.

Mr. George C. Becker
Mr. and Mrs. Harry Christensen

Mrs. Nellie Cotton
Mrs. May Grubba
Mrs. Raymond Kraft
Mrs. Alvina Marchel
Mrs. Louis Maskowski
Mr. John Ramczyk
Mr. and Mrs. Henry Sobish

Jordan Park Land Acquisitions/History

Gerald Ernst:	Park Superintendent of Portage County
Cindi Neuman:	Secretary to Mr. Ernst

Soils

James Bowles: UW-SP Natural Resources Department

Topography

Phillip Bjork: UW-SP Geology Department

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APPENDICES

APPENDIX A

VISITOR CENTERS IN WISCONSIN

Boerner Botanical Gardens, Whitnall Park - Hales Corner, WI

This facility is operated by the Milwaukee County Parks. A great majority of the visitors are students in class groups, about 10,000 per year, and are mainly from the Milwaukee Public Schools. Other youth groups that attend the center are boy scouts and girl scouts. Approximately ten percent of the visitors are senior citizens who live in condominiums in the area. Bird watching groups frequent the center. The botanical gardens attract many out-of-state visitors and also people from other countries. The center is visited by a variety of ethnic groups. As an example there is an increasing number of Spanish speaking and Asian people. Handicapped groups are also encouraged to attend the center. Ramps and wheelchairs are available for those who need them.

The Hales Corner center has a variety of programs and activities. For example, there are special Saturday and Sunday meetings for naturalists and volunteer naturalists. Ninety percent of the volunteer naturalists are college students although there is no restriction of age or background. The National Historical Society meets at the center one evening per month. A special leadership training program for youth is given on four Saturdays in the year. Action workshops are given for bird study, wild flower study, etc. At times there are special lectures and seasonal hikes. Recreational activities such as skiing and tobogganing overlap with the other uses of the center. When the new center is opened, educational activities will be completely separate from recreational activities. Visitor evaluation of the center and its activities are mostly verbal. There is also a chance for input at the workshops. More comments about the center are made by professional people and the various societies that use the center.

Trees for Tomorrow Conservation Camp - Eagle River, WI

This center is known for its conservation education camp. Many high school students attend environmental as well as career workshops. Four thousand student visitors per year register at the camp. More than 1,200 high school pupils attend three-day workshops. Special workshops are given for the Wisconsin State Assembly and Legislature. The center conducts in-service training for forestry personnel. Environmental and innovative courses are given for teachers. Education specialists and resource technicians numbering 250 or more in a single season are part of the camp faculty.

The advantage of this center is that it brings many types of people together in its programs. Some visitors are vigorous, others are not. Some are at camp for the first time; others are professionals in conservation and education.

Devil's Lake State Park - Baraboo, WI

This facility is operated by the Wisconsin Department of Natural Resources. Five to ten percent of the center's visitors are school groups. Fifty to sixty percent of the visitors are out-of-staters, mostly from Illinois and other midwest states. Historical societies, conservation clubs, and other outdoor groups use the facilities of the center. Most people come to the center for recreational purposes--picnicking, swimming, and sunbathing. The lake and bluffs are also big attractions.

The facility has an amphitheater at which evening discussions for the public take place. The naturalist found the use of "home-made" slide programs to be very effective.

There has been quite a bit of verbal feedback from the visitors. Written opportunities are there but are not taken advantage of.

MacKenzie Environmental - Poynette, WI

Operated by the Wisconsin Department of Natural Resources, special features of this center are the logging museum, native animals, and an arboretum of native and exotic trees. The largest group attending the center are elementary and junior high school groups. The center considers itself to be an outdoor classroom and wants to work with students on some specific educational objective. The staff tries to tailor each visit to meet each school's particular needs.

Madison School Forest - Madison, WI

Madison Public Schools operate the center servicing approximately 10,000 elementary school students per year. An overnight camping program can be arranged for school groups. Boy scouts and girl scouts at times use the facility on weekends. Also teachers may take seminar courses here for credit. Other groups of visitors are picnickers and bird watchers.

In the summer, a work learning program is conducted for eighty high school boys and ten teachers. They work on forest and stream improvement--harvesting trees, then sawing and using the wood to build cabins. All buildings at the center are built by hand.

Hawthorn Glen Natural Resource Center - Milwaukee, WI

The center is operated by the Milwaukee Public Schools, Division of Municipal Recreation and Adult Education. School children account for the largest attendance, ninety percent. Scouts also frequent the center. There are special programs for mentally and physically handicapped children. Soon there will be a trail for the blind. Ramps and wheelchairs are available. Families also use the center for reunions and receptions. Ninety percent of the center's activities are recreational.

Riveredge Nature Center - Newberg, WI

The Wisconsin Department of Natural Resources and the Milwaukee Public Schools operate this nature center. Jointly, 35,000 visitors attend the center yearly. Ten thousand of that number are school students. Special education programs are arranged for the learning disabled and the retarded. Next fall there will be a trail for the handicapped on a self-guided basis. Ecology courses are given for teachers and other adults. Scouts, garden clubs, 4-H, and men's clubs use the facility. Summer ecology camp programs are also provided for students.

Janesville Schools Outdoor Laboratory - Janesville, WI

This area is used almost entirely for students and teachers. Infrequently, hobbyists, boy and girl scouts, and garden clubs use the facility. There are no programs for the general public. Eight to ten thousand students use the center per year. Fifth graders go out to the center officially three times a year--fall, spring, and winter. These are all-day events. Eighth graders use the center in the spring. Teachers of other grades may bring their students at any time if they so choose. When elementary age students visit the center, they are guided by high school students and teachers who have attended workshops.

Junior high students are working on markers for the trails. High school students use the center for social studies, biology, agriculture, and business classes. In addition, English classes use the center for creative writing classes.

Willow Brook Glen - Sheboygan, WI

This center is operated by the Sheboygan Public Schools. Twenty or thirty school groups attend the center each year. Since there is no staff, teachers and principals take groups (usually high school biology classes) to the centers. Tree planting is one of the activities that takes place each year.

University of Wisconsin Arboretum - Madison, WI

The arboretum has no building for people to visit. There is, however, a nature awareness center where one can get information on the various trails. The arboretum is a teaching and research area. There are programs for elementary school children, handicapped, college students, and naturalist training.

APPENDIX B

SAMPLE SCRIPTS

Script: Interpreting the Urban Environment

1. Title Slide: Interpreting the Urban Environment

   Let's take a walk through Stevens Point. We won't follow any definite route. We'll just roam around different parts of the city to see what we can see.

2. Slide: downtown, shot of 1st National Bank

   Downtown is a good place to start. As we stroll along, open those big, unused eyes of yours to the nature in the city. Trees and bushes are often found in the business district. How many times have you walked by them without really taking a close look at them?

3. Slide: bird droppings by a window

   Birds live in the city, even downtown. Sometimes we don't see the actual feathered fertilizer spreader but we often find its calling card. When you come across a mess like this, look up, cautiously, and you may find the bird.

4. Slide: awning where bird was roosting

   Or you may just find the place where it spent the night, sheltered from the wind and cold. In summer, you may find a nest here. Merchants put up awnings to shield their window displays from the sun's rays, and to protect shoppers from the elements. The merchants seldom realize that by doing this, they are providing roosts for our small city birds.

5. Slide: water flowing past a curb

   The water flowing past the curb is like a raging river. Watch its cutting action. The blocks of snow and ice will be worn away like islands and sand bars in a real river. Many of the patterns of a natural river can be seen in these curbside streams.

6. Slide: brushy area between two buildings

   Who knows what lurks in little, brushy areas like this, between two buildings by the railroad tracks? These waste spaces contain many plants and small animals which can be studied.

7. Slide: brushy area along railroad tracks

The weedy growths along railroad tracks aren't attractive to many people. They want to cut these plants down, thus wiping out a whole community of living things.

8. Slide: brushy scene, bird tracks in snow

These tangled growths provide food and shelter for all sorts of animals in summer and in winter. Look closely, and you can see the tracks left by an animal.

9. Slide: bird tracks in snow

What kind of animal was it? Probably a house sparrow. Was it running, walking, or hopping, as it fed on the seeds of the plants? I'd say it was hopping too. Notice how the foot prints are close together. We keep our feet close together when we hop, right?

10. Slide: deciduous tree and conifer side by side, snow on branches

Let's leave the downtown area and take a walk down a residential street. All sorts of wondrous things await us here. Look at the contrasts between these two trees.

11. Slide: old tree

Day after day, people walk by this old tree without stopping to take a closer look at it. Let's go across the street and examine it.

12. Slide: close up of old tree

This tree is a home for some animal. Plants called fungi also make a home here.

13. Slide: tree with large brick-filled cavity

Here's an interesting tree. I'll bet you'll never find one like this in the woods. Let's take a closer look at it.

14. Slide: close up of bricked up tree

Someone must have thought that it was worth the time and money to keep this tree from falling over. I imagine that the bricks are taking the place of the wood which rotted away, thus keeping this old tree from toppling over.

15. Slide: sidewalk pushed up by tree

This is a common city sight. Tree roots, as they spread out to get moisture and nutrients for the tree, often push up a portion of someone's sidewalk. The concrete may even be broken or cracked by the action of the roots.

16. Slide: old stone wall, cracking and breaking apart

The works of man, like this stone wall, often show the effects of nature's actions. We can't count the number of times that freezing and thawing occurred here, to form the cracks in the wall.

17. Slide: closer view of crumbling wall

Soil washed into these cracks, seeds or spores found their way in and, finding conditions to their liking, began to grow. The result - nature invades the works of man.

18. Slide: bare tree with nest

Examine the bare limbs of trees in winter. As you passed by some of these trees last summer, were you aware that squirrels or birds were living in them? Their nests, once hidden, are right out in the open now.

19. Slide: entrance to cemetery

Let's take a quiet stroll through this cemetery. There's lots to see here. This peaceful and tranquil area contains all sorts of plants and animals, as well as links to our city's history.

20. Slide: tombstones

There are many stories written on these tombstones, if only we take the time to study them.

21. Slide: old worn, faded, Polish tombstone

Look at this one. It's becoming old and worn. Look how long it's been exposed to the effects of wind, sun, snow, and rain. Lichens are growing here, just like they do on rocks in the woods.

22. Slide: grave of Civil War vet

Our Civil War occurred over 100 years ago, but here is a reminder of that war. We know of that conflict only from the written lines in our history books, but here are the remains of a man who helped to make history.

23. Slide: broken pieces of acorn on a tombstone

Here's a strange dinner table. Do you have any idea who ate here, and left these messy leftovers behind?

24. Slide: old train depot

Let's head over to the old railroad station. Except for the workmen, few people enter it. It's usually deserted, for the passenger trains departed from our town long ago.

25. Slide: closer shot of old depot

Notice how the grass and weeds are invading the platform where countless passengers once stood? Let's look around the building.

26. Slide: bird nest by roof

Transients, usually called hobos, often hung around depots in the past. Looks like a feathered visitor lived here for awhile.

27. Slide: water trickling down from depot drainpipe

About the only thing taking a long journey away from here now is this melting snow.

28. Slide: water striking ground

After striking the ground, it will slowly trickle down the street.

29. Slide: water running down the street

Puddles will form, and gradually this water will form a little

30. Slide: water running down street

stream. It will flow, until it comes to a

31. Slide: water running into sewer

sewer, where its journey will end. Actually, it's journey is just beginning. But it's getting late, and time to go home. We'll save some things for another walk through the city, some other time.

Script for Ms. Honeybee Audio Station

I am the amazing Ms. Honeybee.

My sisters and I have been living together, toiling for Old Ma Nature, for a long, long time. We make a fine natural sweetener that's just loved by people and by pesty bears. We make a fine wax too.

Without us, you would be without many of the fruits that you like to eat, for we pollinate the flowers as we gather nectar and pollen from them.

We control the climate in our hives just like you do in your homes. We had air conditioning before you did too. And with our system, we won't worry about any power failure this summer.

We defend our hive too. Our stingers are filled with poison and are like a doctor's hypodermic needle.

Just look at us as we go about our jobs. We had division of labor long before people did. Try and spot the different work that's going on in the hive.

You won't find me though. I've got a lot to do, and since I only live four weeks, before I grow old and die, I'm going to buzzzzzzzz off and visit the flowers, maybe for one last time.

APPENDIX C

PLANT LIST, JORDAN PARK SCHOOLYARD AND WOODLAND AREAS
MARCH 18, 1974

Fungi, lichens and mosses are abundant in Jordan Park. Bracket fungi and mushrooms have been noted as well as three groups of lichens: crustose, foliose and fruticose.

Two easily identified mosses have been found: *Sphagnum* and *Polytrichum* (haircap moss).

The vascular plant families are listed in the order in which they appear in *Gray's Manual of Botany*, 8th ed., 1950.

FAMILY	GENUS AND SPECIES	COMMON NAME
Equisetaceae	*Equisetum*	Scouring rushes Horsetails
Lycopodiaceae	*Lycopodium clavatum*	Stag horn club moss
	L. complanatum	Ground cedar
	L. lucidulum	Shining club moss
	L. obscurum	Ground pine
Selaginellaceae	*Selaginella*	Spikemoss
Osmundaceae	*Osmunda cinnamomea*	Cinnamon fern
	O. claytoniana	Interrupted fern
	O. regalis	Royal fern
Polypodiaceae	*Athyrium filix-femina*	Lady fern
	Dryopteris cristata	Crested wood fern
	D. spinulosa	Wood fern
	D. thelypteris or *Thelypteris palustris*	Marsh fern
	Onoclea sensibilis	Sensitive fern
	Pteridium aquilinum	Bracken fern
Pinaceae	*Abies balsamea*	Balsam fir
	Pinus banksiana	Jack pine
	P. resinosa	Red pine
	P. strobus	White pine
	Tsuga canadensis	Hemlock
Graminae	*Andropogon gerardi*	Beardgrass
	Sorghastrum nutans	Indian grass, wood grass
Cyperaceae	*Scirpus*	Bulrush

FAMILY	GENUS AND SPECIES	COMMON NAME
Liliaceae	*Lilium michiganense*	Michigan lily
	Maianthemum canadense	Canada mayflower
	Polygonatum biflorum	Solomon's seal
	P. canaliculatum	Great Solomon's seal
	Smilacina racemosa	False Solomon's seal
	Smilax eccirrhata	Greenbriers
	Streptopus roseus	Twisted stalk; rose mandarin
	Uvularia sessilifolia	Wild oats; merry bells
Iridaceae	*Iris*	
Salicaceae	*Populus tremuloides*	Quaking aspen; small-toothed aspen; popple
	Salix	Pussy willow
Myricaceae	*Comptonia peregrina*	Sweet fern

FAMILY	GENUS AND SPECIES	COMMON NAME
Corylaceae	Alnus rugosa	Speckled alder; tag alder
	Betula papyrifera	Paper birch; canoe birch; white birch
	Corylus americana	Hazel; hazelbrush
Fagaceae	Quercus macrocarpa	Bur oak
	Q. ellipsoidalis	Jack oak; Hill's oak
	Q. rubra (borealis)	Red oak
Portulacaceae	Claytonia virginica	Spring beauty
Caryophyllaceae	Arenaria	Sandwort
	Silene cucubalus	Bladder campion
Ranunculaceae	Anemone quinquefolia	Wood anemone
	Aquilegia	Columbine
	Coptis groenlandica	Gold thread
	Ranunculus	Wild buttercup
	R. pensylvanicus	Bristly buttercup
	Thalictrum	Meadow rue
Cruciferae	Arabis	Rock cress
	A. laevigata	Smooth rock cress
	Berteroa incana	Hoary alyssum
Saxifragaceae	Ribes	Gooseberry
Roseaceae	Amelanchier	Shadbush
	Aronia	Chokeberries
	Crataegus	Hawthorn; Thorn apple
	Fragaria virginiana	Wild strawberry
	Geum virginianum	Rough avens
	Potentilla simplex	Common cinquefoil; five-finger
	Prunus pensylvanica	Pin cherry
	P. serotina	Black cherry
	P. virginiana	Chokecherry
	Pyrus malus	Apple
	Rosa	Wild Rose
	R. carolina	Pasture rose
	R. palustris	Swamp rose
	Rubus; the dewberries	Dewberry
	the blackberries	Blackberry
	R. idaeus	Red raspberry
	Spiraea latifolia	Meadowsweet
	S. tomentosa	Steeplebush

Leguminosae	*Lespedeza virginica*	Bush clover
	Vicia cracca	Cow vetch
Polygalaceae	*Polygala*	Sand milkwort
	P. paucifolia	Gaywings; Fringed polygala
Euphorbiaceae	*Euphorbia corollata*	Flowering spurge
Anacardiaceae	*Rhus radicans*	Poison ivy
Aquifoliaceae	*Ilex montana*	Mountain holly
	I. verticillata	Winterberry; black alder
Celastraceae	*Celastrus scandens*	Bittersweet
Aceraceae	*Acer rubrum*	Red maple; scarlet, soft or swamp maple
Vitaceae	*Parthenocissus quinquefolia*	Virginia creeper, woodbine
Guttiferae	*Hypericum*	St. Johnswort
Cistaceae	*Helianthemum canadense*	Frost weed
Violaceae	*Viola pedata*	Birdsfoot violet
	V. tricolor	Johnny jump-up
Lythraceae	*Decodon verticillatus*	Swamp loosestrife
Onagraceae	*Oenothera biennis*	Evening primrose
Umbelliferae	*Cicuta maculata*	Water hemlock
Cornaceae	*Cornus canadensis*	Bunchberry
	C. racemosa	Gray dogwood
Pyrolaceae	*Chimaphila umbellata*	Pipsissewa; Prince's pine
	Monotropa uniflora	Indian pipe
	Pyrola elliptica	Shinleaf; Pyrola
	P. secunda	One-sided pyrola
Ericaceae	*Epigaea repens*	Trailing arbutus
	Gaultheria procumbens	Wintergreen
	Gaylussacia	Huckleberry
	Vaccinium angustifolium	Blueberry

FAMILY	GENUS AND SPECIES	COMMON NAME
Primulaceae	*Lysimachia ciliata*	Fringed loosestrife
	L. lanceolata	Lance-leaved loosestrife
	L. quadrifolia	Whorled loosestrife
	L. terrestris	Swamp candle; Yellow loosestrife
	Trientalis borealis	Starflower
Apocynaceae	*Apocynum*	Dogbane
Asclepiadaceae	*Asclepias syriaca*	Milkweed
Convolvulaceae	*Convolvulus*	Bindweed
Boraginaceae	*Lithospermum*	Puccoon
	L. canescens	Hoary puccoon
Labiatae	*Mentha*	Mint
	Monarda	Bergamot
	Prunella vulgaris	Heal all
	Scutellaria	Skullcap
	S. epilobiifoia	Marsh skullcap
	S. parvula	Smaller skullcap
	Stachys tenuifolia	Hedge nettle, pink, smooth
	S. tenuifolia var. *hispida*	Rough hedge nettle
Scrophulariaceae	*Linaria vulgaris*	Butter and eggs
	Melampyrum lineare	Cowwheat
	Pedicularis canadensis	Wood betony
	Veronicastrum virginicum	Culver's root
	Verbascum thapsus	Mullein
Rubiaceae	*Galium asprellum*	Rough bedstraw
	G. boreale	Northern bedstraw
	G. triflorum	Fragrant bedstraw
	Houstonia caerulea	Bluets
	Mitchella repens	Partridge berry
Caprifoliaceae	*Diervilla lonicera*	Bush honeysuckle
	Viburnum acerifolium	Maple-leaved viburnum; Arrowwood
	V. t[illegible]*um*	Highbush cranberry
Campanulaceae	*Campanula uliginosa*	Marsh bellflower
	Lobelia dortmanna	Water lobelia

Compositae	*Achillea millefolium*	Yarrow
	Ambrosia	Ragweed
	Anaphalis margaritacea	Pearly everlasting
	Antennaria	Pussytoes
	Artemesia ludoviciana	White sage, western mugwort
	Aster ciliolatus	
	A. laevis	
	A. umbellatus	Flat-topped white aster
	Centaurea	Knapweed
	Crepis capillaris	Smooth Hawksbeard
	Erigeron	Daisy fleabane
	Gnaphalium obtusifolium	Sweet everlasting
	Helianthus	Sunflower
	Hieracium	Hawkweed
	Krigis biflora	Two-flowered cynthia
	Lactua canadensis	Wild lettuce
	Solidago	Goldenrod
	S. nemoralis	Wand goldenrod
	Tragopogon pratensis	Goat's beard

LIST OF BIRDS SEEN IN JORDAN PARK

The birds are listed according to the order in which they appear in *A Field Guide to the Birds* by R. T. Peterson, 3rd ed., 1947.

Colymbiae	*Colymbus auritus*	Horned grebe
Ardeidae	*Butorides virescens virescens*	Green heron
Anatinae	*Aix sponsa*	Wood duck
Buteoninae	*Buteo jamaicensis*	Red-tailed hawk
Tetraonidae	*Bonasa umbellus*	Ruffed grouse
Phasianidae	*Perdix perdix*	Partridge
Cuculidae	*Coccyzus*	Cuckoo
Tytonidae	*Bubo virginianus*	Great horned owl
Picidae	*Colaptus auratus*	Flicker
	Dendrocopus villosus	Hairy woodpecker
Tyrannidae	*Myiarchus crinitus*	Crested flycatcher
	Sazornis phoebe	Phoebe
	Contopus virens	Wood peewee

Corvidae	*Cyanocitta cristata*	Blue jay
	Corvus brachyrhynchos	Crow
Paridae	*Parus atricapillus*	Black-capped chickadee
Sittidae	*Sitta*	Nuthatch
Mimidae	*Dumetella carolinensis*	Catbird
Turdidae	*Turdus migratorius*	Robin
	Hylocichla mustelina	Wood thrush
	H. fuscescens	Veery
	Sialia sialis	Bluebird
Vireonidae	*Vireo olivaceous*	Red-eyed vireo
Parulidae	*Mniotilta varia*	Black and white warbler
	Vermivora ruficapilla ruficapilla	Nashville warbler
	Dendroica fusca	Blackburnian warbler
	D. pensylvanica	Chestnut-sided warbler
	D. pinus	Pine warbler
	Seirus aurocapillus	Ovenbird
	Oporornis philadelphia	Mourning warbler
	Geothlypis trichas	Yellow-throat
	Setophaga ruticilla	American redstart
Ploceidae	*Passer domesticus domesticus*	House or English sparrow
Icteridae	*Icterus galbula*	Baltimore oriole
	Molothrus ater ater	Cowbird
Thraupidae	*Piranga*	Tanager
	Piranga olivacea	Scarlet tanager
Fringilladae	*Pheucticus ludovicianus*	Rose-breasted grosbeak
	Passerina cyanea	Indigo bunting
	Carpodacus purpureus purpureus	Purple finch
	Spinus tristis tristis	Common goldfinch
	Pipilo erythrophthalmus	Towhee
	Spizella passerina passerina	Chipping sparrow
	S. pusilla pusilla	Field sparrow
	Melospiza melodia	Song sparrow